ONE HUNDRED NEW NEMAS
(Type Species of 100 New Genera)

CONTRIBUTIONS TO A SCIENCE OF NEMATOLOGY, IX

By N. A. Cobb

The arrangement of the genera in the following pages will serve, to a considerable extent, to define and illustrate the orders proposed on page 214. This is especially true of all except the Litinius, Bolbinia, Mesoconch and Aphonch. In each order, a genus has been selected and given a name philologically connected with that of the order, in fact, the singular of the order name, and, in most cases, these genera may be considered as genera typical of the orders,—for instance, Axonchium may be taken as typical of the order Axonchia.

So far as it is found advisable to accept the classification proposed, it might be well to keep in mind in the establishment of the many new genera which the future will undoubtedly disclose, the application of similar names to those genera which most nearly represent the average structure of the order. In carrying out this idea, such names as Cytoplaimella, Isolaimella, and other derivatives at once suggest themselves.

It is already becoming evident that some of these groups may probably early be advantageously subdivided; e.g., Cytoplaimia, Axonchia. In case of subdivision, the principles alluded to in the footnote to page 213 might lead to such an action as the following: Amending the definition of the existing order and segregating the new order, and utilizing for the new order-name the roots already suggested (see p. 214, lines 27–28) together with appropriate prefixes. This would result in building up a comparatively simple, rather homogenous and characteristic nomenclature for the nemat phylum.

In each order the genera are arranged somewhat in accordance with their relationships. Genera of doubtful relationship are usually placed near the beginning or near the end of the order series, and not infrequently appear, in the light of our present knowledge, to be intermediate, or indeterminate, forms. Thus, Rhadinema flexile at the beginning of the Isolaimia, p. 256, is doubtfully placed, and may be a cytolaim; so Nannolaimus, p. 255, may perhaps be a litiniian form. Most of the order series present these special cases.

217

**KEY AND CHARACTERS**

**PHARYNX ABSENT, or so obscure as to escape notice**

*Oesophagus with median or posterior bulb or swelling, or both*

- *Amphid shape of the amphid spiral; striae not resolvable, not altered on the lateral fields*
- *Spinneret present*
- *Shape of the amphid spiral, circular, or elliptical; when tubular, surface contour circular*
- *Ovaries one; striae coarse; setae 12, 4-jointed; pharynx somewhat zigzag; setae minute*
- *Cheeks, if thick, not heavily cutinized; lips 6, lateral*
- *Intestinal cells not with crystals; lips none; cephalic setae papilliform*
- *Ovaries one; lips 6, subcephalic; amphids two or more circles*
- *Ovaries two; lips small; aphrodisia not on the lateral fields*
- *Cheeks, if thick, not heavily cutinized; lips none; cephalic setae papilliform*
- *Ovaries one; lips 6, lateral*
- *Cheeks, if thick, not heavily cutinized; lips none; cephalic setae papilliform*

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**PHARYNX PRESENT**

**Wall of the pharynx unarmed (see also note page 221, middle)**

*Oesophagus, or absent, or so obscure as to escape notice*

- *Shape of the amphid spiral, circular, or elliptical; when tubular, surface contour circular*
- *Ovaries one; lips 6, subcephalic; amphids two or more circles*
- *Ovaries two; lips small; aphrodisia on the lateral fields*
- *Ovaries one; lips 6, subcephalic; amphids two or more circles*
- *Ovaries two; lips small; aphrodisia not on the lateral fields*
- *Cheeks, if thick, not heavily cutinized; lips none; cephalic setae papilliform*
- *Ovaries one; lips 6, lateral*
- *Cheeks, if thick, not heavily cutinized; lips none; cephalic setae papilliform*

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*For abbreviations used in the Key, see foot-note p. 222.*
Lip-region retractile; cephalic setae 4, rather obviously segmented. Lip-region non-retractile; cephalic setae 10, not obviously segmented. Striae in oral tube altered laterally, or very little; cephalic setae 10. Lipsthin and flap-like; cephalic setae elongate and obviously segmented.

Wings present; striae fine, resolvable; lips 6, confluent, bipapillate. -f-. Wings absent; tooth with apophysis faintly Y-shaped; striae coarse; amphid labia (L). Female sexual organs double.

Head expanded, naked; striae not retrorse; tooth small; lips minute. Setae cephalic 10, subcephalic 4; non-striated; onchus spear-like. Obscure. Xenonema (Micromaeon) Xanthodora (Campylofa) (Gonionchus) Isonemella (Isonemella) Amphispira (Croconema) Rhinema Actinonema (Polysigma) New Genera Ptycholaimellus (Mesodorus) Cophonchus (Bolbolaimus) Synonema Anticyclus (Bolbolaimus) Synonema (Bolbolaimus) Mesodorus Synonema (Bolbolaimus) Ypsilon Rhips (Polysigma) (Polysigma) 110

The shape of the amphids spiral, circular, or elliptical. Form of the amphids spiral, circular, or elliptical. Striae in oral tube altered laterally, or very little; cephalic setae 10. Lipsthin and flap-like; cephalic setae elongate and obviously segmented.

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KEY TO THE MALES

Nema dimensions sometimes vary perceptibly with varying technique. As a rule, information conveyed in the keys, formulae and illustrations is not repeated elsewhere. Following other authors, the measurements for the ovaries are given separately instead of in the form of a single measurement as formerly. Furthermore, the occasional stroke indicating the presence and position of the excretory pore is here, in No. IX, placed below the formula line, the assumption being that the formula shows the nema ventral side down. The general form of the spicula and accessories is shown in the formula for the male, as is also the presence, number and position of the supplements,—indicated by small suffixes before and after the anal measurement figure. The spicula diagrams are of three different degrees of curvature, indicating nearly straight, arculate and strongly arculate spicula. The nature of the proximal ends of the spicula is indicated, i.e., whether cephalated, and if cephalated, whether by contraction, constriction or expansion. Also, if it exists, the presence of an apophysis to the gubernaculum is indicated. The short, horizontal marks indicating the wings and the presence and relative diameter of the cephalopodal swellings are only dotted when these features are not of a pronounced nature. The mark indicating the presence of a spinerner is either plain or so conventionalized as to indicate that the spinerner is supplied with setae. The absence of any particular mark in the formula is practically always to be taken as indicating that the particular feature in question is non-existent. Doubt is expressed by a question mark. The reason for calling attention to these special marks is that until one becomes accustomed to them they may appear rather insignificant. Once recognized, they may save the reader considerable time and trouble.

The adjacent table shows the various formula lines by which the number of striae per millimeter is indicated. See also pages 6 and 7, where the various signs used in the formula are explained in full. In this number, the presence of a bursa is indicated by a curved stroke under the transverse anal measurement figure, and the number of bursal ribs in front of and behind the anus is indicated by suffixes in front of and behind the anal measurement figure. Furthermore, as already noted, the form of the spicula and gubernaculum is indicated by conventionalized sketches appropriately placed. See, for instance, page 279.

In the following rather arbitrary designations, which are expressed in a written formula, only the papillae and ribs on one side of the bursa are considered. They are designated according to their proximity to each other and not according to their anatomical and physiological characters. They are regarded as either anal, pre-anal, or post-anal, according as they are opposite to, in front of, or behind the anus. In the graphical bursal formulae, the anus is represented by a pair of parenthesis marks; all papillae opposite the anus are indicated in the parenthesis, the pre-anal papillae are indicated in front of the parenthesis, and the post-anal papillae after the parenthesis. The papillae and ribs are considered as a single longitudinal series, and each group is indicated by a digit representing the number of ribs or papillae in the group. The longitudinal spaces separating the groups of papillae and ribs are indicated by commas and semicolons, the commas representing a short space, the semicolon a longer space. In some cases before and after the parenthesis, the punctuation mark may be omitted, thus indicating that the ribs or papillae are even nearer to the anus than in those cases where the separation is indicated by a comma or semicolon. A blank space in the type after the comma, or after the semicolon, indicates a longer space than is indicated by the comma or semicolon alone. By such simple means it is possible to indicate with considerable accuracy the grouping and latitude of these various organs and groups of organs. A glance at the above illustration, Fig. 0, and formula immediately underneath will make the matter clear.
"UNLESS OTHERWISE INDICATED"

GENERAL—Unless otherwise indicated,—

1. The species described under a generic name is to be regarded as the type species of the genus; where more than one species is described, the type species is specifically designated.

2. The text terms and formulas apply to the nemas as viewed in profile. References to stain are restricted to acid carmine.

3. The cuticle is colorless.

4. The cuticle is striated—sometimes, however, so finely striated as to be resolvable only with the highest powers of the microscope used skillfully under favorable conditions. The division line of the formula is used to indicate approximately the number of striae per millimeter. (See page 227.)

5. The striae are approximately uniform in width throughout the length of the body except toward the extremities.

6. The contour is plain.

7. The striae are not resolvable into secondary elements. The presence of secondary elements is indicated in the formula. (See page 227.)

8. The longitudinal striations are due to the attachments of the musculature.

9. There are no obvious series of pores in the cuticle.

10. There are no eye-spots.

11. There are no definite valves in the oesophageal bulb.

12. The lining of the oesophagus is a distinct, but not conspicuous, feature, practically throughout its length.

13. The intestine is set off from the oesophagus by a distinct constriction.

14. The arrangement of the granules in the cells of the intestine is not such as to give rise to a tessellated effect.

15. There is no pro-rectum.

16. The rectum extends inward and forward at an angle of about thirty to forty degrees.

17. The tail, at least that of the female, is straight, or nearly so.

18. The esophagi, as well as the posterior cerebral, rictae, are perpendicular to the cuticle, or nearly so.

19. The tesette cell lies behind the base of the neck.

20. The nematode surrounds the oesophagus rather squarely.

21. Absence of the formula for either sex indicates that that sex is unknown at the present time.

FEMALE—Unless otherwise indicated,—

22. The vagina is understood to lead inward at right angles to the ventral surface.

23. The uterus is more or less straight.

24. The eggs are thin-shelled and smooth, and are deposited before segmentation begins.

MALE—Unless otherwise indicated,—

25. There is no bursa.

26. The tail of the male is similar to that of the female in form.

27. The spicules are two in number, equal in size, and appear moderately arculate when viewed in profile, and are simple, i.e., without obvious extra component longitudinal stiffening elements.

28. The accessory piece (or pieces), gubernaculum, lies more or less parallel to the spicula, and has no inward or backward-pointing apophysis.

NEW MORPHOLOGICAL AND PHYSIOLOGICAL DATA

New Data

Apart from indicating that the nemat phylum can be divided into valid, natural orders on the basis of the structure of the mouth parts and related organs, this article records numerous additions to our knowledge of the morphology of nemas. Facta announced in a sentence or two, or through the medium of illustrations, might perhaps have been advantageously made the subject of separate papers. Among these additions to our knowledge, the following may be mentioned:

1. In a miscellaneous lot of over one hundred new genera of nemas, thirty per cent prove to have jointed setae. Probably a much larger percentage have joined setae. Among the nemas having setae, jointed setae are probably the rule rather than the exception.

2. The distal ends of the exhalant siphon sometimes exhibit considerable complexity, indicating that they are specially developed sense organs; e.g., Linhamoella and Cryophilhamaema.

3. Additional evidence that bilateral mouth-parts arise by elimination of dorsal elements exists in Pseudonchus.

4. There is a large group of nemas with six well-developed onchi having an outward stroke, adapted for digging; e.g., Apodotina and relatives.

5. More than ever, it is clear that amphids are practically universal among the free-living nemas. They may be small and difficult to see; as in Stilbonema and Laxonema. In the past, they have been sometimes overlooked. Some Triplonchs possess amphids; e.g., Onchium, Triplonchium.

6. All amphids have backward connections—often, perhaps always, tubular and containing coagulable substance. Of unusual interest are the huge glands of Tonema.

7. Lateral series of organs occur in so many of the genera described, as to lend additional weight to the opinion that such series are a normal element of the nemat structure.

8. There is much additional evidence of differentiation of form and structure among the various cells of the intestine.

9. The presence of oesophageal glands is established for Aporhinchia and its relatives, (Dorylaimus, etc.;) They occur in the posterior enlargement of the oesophagus, one emptying into the lumen dorsally in its anterior part, and often two others emptying into the lumen farther back.

10. Non-terminal spinOBJECTS and mouth openings seem practically aways ventral; e.g., Triplonchium, Campylamus.

11. A large unicellular gland is connected with each supplement of the males of Bothella and Euphanta. In the past, it has been observed with species of Bothella and Euphanta, in which the supplement are connected by a bursa, which is the only structure in which the two sexes are connected.

12. The presence of pairs of clasical glands in the male, first observed by de Man in Bothella subverticillata, is established for many other genera.

13. Cytolaimus transition-forms exist between the parasitic and free-living nemas; e.g., Monhystra, etc.

14. The existence of double-jointed spicula is established for Bothella and Xinema. Nemat are also recorded in which the sperm cells are of extraordinary size; such species may prove useful in studies in genetics.

15. Bothellinae are distributed in various oceans. They are free-living nemas with beak-like heads, but otherwise normal in form. Presumably, this beak serves to extract food from receptacles the entrances to which are narrow.

16. There is a marked absence of syngamy in marine forms.

17. The existence is demonstrated of special spermatheca, in the form of special separate bristles of the female sexual organs.
have not been satisfactory, but it appears as if there is a small, narrow, elongated ventral gland a short distance behind the cardiac constriction, where the intestine lies a little to one side. Each lateral field contains large ellipsoidal cells—too large to be placed side by side within its limits; they are placed alternately to one side and then the other. Their size is such that, in the neck at least, if they were arranged single file they would make a continuous series a little more than half as wide as the field and about one-third as wide as the body. From the raised vulva, the vagina leads half way across the body, where it joins the single uterus, which extends backward. The ovary reaches about half way back to the vulva and contains a score or more of developing ova, which are arranged for the most part single file. Anterior branch rudimentary. The elongated eggs are about four times as long as the body is wide and about one-sixth as wide as long. The tail of the male is slightly more arcuate than that of his mate. Opposite the proximal ends of the spicula there is a very low, rounded, ventral elevation. Near the ventral line in front of the anus for a distance two to three times as great as the length of the tail there are a few minute setae, about one-eighth as long as the body is wide, and immediately behind the anus there are one or two similar setae; otherwise there are no indications of special papillae or setae. Spicula about one and one-half times as long as the anal body diameter. Their proximal ends lie near the dorsal side of the body.

Habitat: Algae and marine sand at their bases, in surf, Island off Port Royal, Jamaica. Sublimed to balsam. Fig. 2.

3. Tycnodora pachydermatana sp. n. sp. 3.21 18.84. Cuticle thick, glassy; near the head more nearly colorless, sometimes smoky, at any rate after treatment with Flemming's solution; near the middle of the body, occupying one-sixth the radius; near the spinneret much thinner than elsewhere; rather suddenly diminishing in thickness near the nerve-ring. Lining of oesophagus sub-different; the musculature fine and colorless. There is no cardia. The thin-walled intestine is separated from the oesophagus by a collar one-fourth as wide as the body. The lumen of the intestine is faint. From the deformed anus the inconspicuous rectum extends inward a distance twice as great as the anal body diameter. Very few granules are to be seen in the intestinal cells. The contents of the intestine are finely granular. The more or less arcuate tail is first conoid, then cylindroid in the posterior fourth, where it is about onethird as wide as at the anus. The lateral fields are one-half as wide as the body. From the inconspicuous vulva, the cutinized vagina extends one-third the way across the body. The somewhat cylindroid ovaries extend two-fifths the way back to the vulva and carry twelve to twenty ova arranged more or less single file.

Habitat: "Seagrass," shoal, two miles off Key West, Fla., U. S. A. Flemming to glycerine jelly. Resembles Halalaimus, but the female has two reflexed ovaries. Fig. 3.

4. Schistodera exilis sp. n. sp. 3.57. The naked cuticle is extremely thin. From the mouth about one-third the way to the anterior margin of the lateral organs, the lining of the oesophageal tube is a little more massive than farther back. The amphids are interesting on account of the presence
in the posterior portion of the cavity of each of a strongly staining body, which may be assumed to be protoplasmic. The bottoms of the amphids are strongly ciliated. Oesophagus conoid, finally about half as wide as the base of the neck; just where it joins the intestine it appears to expand suddenly, although this expansion could hardly be called a bulb. It is possible that this expansion indicates the presence of glands about the base of the oesophagus. The intestine becomes at once three-fourths as wide as the body and in cross-section appears to present only two cells. Little that is definite is known concerning the lateral fields, but it is presumed that they are well-developed. The median fields are rather distinct. They contain a series of cells, at any rate in the neck; these cells are about half as long as the neck is wide and are separated from each other by distances about twice as great as their length. Tail of the male at first conoid, then cylindroid in the posterior half, where it is about one-fourth as wide as at the base. The spinocereb has a very minute pore. The excretory glands lie in front of the anus. A straight refractive piece appears to subtend the arc of the spinocereb. These latter are barely ciliated by an almost imperceptible expansion and a previous constriction. Immediately behind the anus there are two or three minute submedian setae; similarly, close to the anus, and in front, there is a pair of subventral setae—all seen with considerable difficulty. The balance of evidence is in favor of the existence of two testes.

Habitat: Algae and sand at their bases, in surf, Island off Port Royal, Jamaica.

Fig. 4.

5. Campylaimus inequalis n. sp. Striae more easily seen along the margin of the amphids. Wings are indicated by the presence in the lateral fields of two or more longitudinal lines very close together and barely resolvable with high powers. The mouth-opener conoid in the lateral fields of the head a little behind the anterior extremity. There are no distinct lips, but the anterior extremity is modified so as to resemble a lip-region; it is set off by a minute constriction and presents a minute depression that takes acid-fast stain more strongly than do the adjacent parts. No doubt this terminal "cusp" serves some distinct function, as tactile or gustatory. The conoid oesophagus finally becomes almost three-fourths as wide as the base of the neck. There does not appear to be any distinct cardia. The base of the oesophagus there is a circle of small cells which stain in the same manner as do the cells of the intestine. This latter becomes at once about three-fourths as wide as the body. The lateral fields have not been distinctly seen. Nothing definite is known about the retractor and excretory pore. Tail conoid to the simple terminus, which is set off by a minute constriction. The caudal glands appear to be located in front of the anus, probably a long distance in front of it. In the male the anus is slightly raised. Spicula about one and one-half times as long as the anal body diameter, their proximal ends slightly ciliated by expansion. They are rather markedly aruncate in their distal two-thirds, but nearly straight in the proximal third. There seems to be but a single testis.

Habitat: Marine sand and mud, San Pedro, California. Fig. 5.

6. Xennella cephalota n. sp. The cuticle, which is of medium thickness, is traversed by six to eight longitudinal ribs or wings. There are at least four cephalic setae, possibly six; otherwise the cuticle seems to be naked. The nitirform head is set off by a distinct constriction. The neck is cylindroid. The conoid oesophagus is at first one-ninth, near the nerve-ring one-fifth, and at last two-fifths as wide as the corresponding portion of the neck. A distinct conoidal swelling contains one or more nuclei, which differ from all other nuclei in the organ. The lining of the oesophagus is indistinct. The intestine is separated from the oesophagus by a collar one-fourth as wide as the base of the neck, and becomes at once three-fourths as wide as the body, and in cross-section presents but few cells. The anterior part of the intestine for a distance equal to the length of the corresponding body-diameter has a structure different from the portion that follows. The cells of the intestine contain numerous very minute granules. The elongated granular testes cell is about as long as the corresponding body diameter, and lies a little in front of the cardia. It is not reduced. Apparently the excretory pore is located near the nerve-ring. This latter is oblique, distinct, and broad. The spicula when viewed dorso-ventrally appear to make an angle of about thirty degrees with each other. The specimens were molting.

Habitat: "Sea-grass," shoal, two miles off Key West, Florida. Figs 6a and 6b.

It is believed only the spinocereb was missing from the single specimen measured. The actual measurements are:

The secondary elements of the striae are on the limits of visibility and reach nearly across the annule. There are probably six, flat, amalgamated lips. The conoid neck contains an oesophagus which is more or less clavate at the rear end. Near the mouth it is one-half, at the nerve-ring two-fifths, and finally three-fifths, as wide as the corresponding portion of the neck; its lining is indistinct. There may be a faint, conoid cardia. Intestine at once about three-fourths as wide as the body, more or less thin-walled, and presenting but few cells in cross-section. The intestinal cells contain numerous, rather uniform granules, regularly placed. From the continuous anus, the cutinized rectum...
**ORDER LITINIA**

is about twice as long as the anal body diameter. Tail conoid. The eggs are two to three times as long as the body is wide. The ovaries are arranged more or less in single file, and the ovary extends two-thirds the way back to the vulva. The proximal ends of the slender, somewhat tapering, rather frail, subacute spicula lie opposite the body axis. There are two rather frail, simple accessory pieces.

**Habitat.** Sand-bar, Biscayne Bay, Florida, U. S. A. Flemming to glycerine jelly. Fig. 7n, p. 233.<br>

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**IONEMA**

*Fig 6.* *Ionema occlusum* n. sp. 4

The thin cuticle is naked except for the cephalic setae. There are no traces of lips. The amphids are very inconspicuous. The neck is cylindrical posteriorly, and convex-conoid anteriorly, especially near the head. The eye spots are light brown in color, and each has a refractive element in front. In the pigmented portion of each eye, to the more or less central nucleus with a subsidiary, small companion object. The cylindrical oesophagus is at first one-third, near the nerve-ring one-fourth, and finally one-fifth, as wide as the corresponding portion of the body. Its lining is indistinct. There is no cardia. Owing to the presence of large somatic glands, observation of the junction of the oesophagus with the intestine is difficult. The colliculus appears to be one-fifth as wide as the corresponding portion of the body. The intestine is two-thirds to three-fourths as wide as the corresponding portion of the body, and is thick-walled, and has a very faint lumen. The cells of the intestine, which appear somewhat as if overlapping, contain more or less uniform, yellowish, scattered granules; they have large, spherical, granular nuclei with conspicuous nucleoli. The amphicere, conoid tail tapers from the anus to the uncinated convex-conoid terminus. The cephalic spiniger is simple in structure. The filipodial caudal glands occur in a loose tangle series in the anterior half of the tail. There are no caudal setae. The lateral fields are two-fifths as wide as the body. The granular, elongated, pitiform renette is one and one-half times as long as the body is wide, and one-half as long as wide. It is not reflexed and lies near the middle of the body, a little in front of the sensory of the front ovary. The nerve-ring is of medium size and is accompanied by rather obscure nerve cells. From the small, elevated, more or less inconspicuous vulva the medium-sized vagina leads inward half way across the body; it is more or less strongly eutimated. The size, form and covering of the eggs is unknown, but the ripe one is short, about as long as the body is wide. The broad, cylindrical ovaries extend five-sixths the way back to the vulva, and contain about twenty ova, arranged single file in the proximal half, but irregularly in the distal half. The duct of the renette is necessarily very long and is slender; there is a distinct, elongated ampulla, with a very long and very slender duct leading from it to the pore. This latter duct is about as long as the body is wide. This genus, of which there are several species, is made very remarkable by the possession of a pair of relatively large glands filling most of the body cavity behind the base of the neck and ending two and one-half times as far behind the neck as this latter is behind the head. The points of exit of these glands appear to be at the head end. Each gland has a nucleus near its blind end. In the vicinity of the nerves leading toward the tip-region to pores, where foreign particles are seen to cling, and which are designated in the drawing as amplicae. Near the middle these glands are pressed to one side by two subdorsal cells, apparently nerve cells.

**Habitat.** Marine algae, Panama. Hot sublimate to balsam. This genus is of wide occurrence in tropical oceans; specimens from both the East and West Indies are known to the writer. While specifically different, these forms do not vary much one from another. Fig. 9.
10. Nemella ocellata n. sp. i 1 11 12 13 14 15 16 17. Except for the cephalic setae, the thin cuticle is naked. At a distance from the anterior extremity about equal to the width of the head, the striation of the cuticle ceases, so that the head is set off by an absence of striations, as well as by a slight thickening of the cuticle. The neck is cylindrical. From the faint amphids, an inner element can be traced backward to near the base of the head. The two eye-spots are brownish in color, and each has a colorless lens. The oesophagus, which has an indistinct lining, is at first one-half, near the nerve-ring also one-half, and finally three-fifths, as wide as the corresponding portion of the neck. There is no cardia. The intestine, which is set off from the oesophagus by a column one-half as wide as the neck, becomes at once three-fourths as wide as the body. Its wall is thick, its lumen faint, and it is made up of cells of such a size that probably only two are required to complete a circumference. These cells are packed with colorless granules of variable size, the largest of which are about one-twenths as wide as the body. The tail is conoid to the convex-conoid spinneret, which at its base is one-third as wide as the base of the tail, and has somewhat the profile of a swan's head. No setae were seen on the tail. At its widest part the simple, hair, tapering, subacute spiculae are about one-fifth as wide as the corresponding part of the body. Their proximal ends, which are minutely ciliated by contraction and constriction, appear to lie a little ventrad from the body axis. They are supported by a simple, rather thin, slender, faintly S-shaped accessory, with a tapering apophysis (?) extending backward from the spicula at an angle of about ninety degrees, and about one-third as long as the anal body-diameter, its proximal end lying opposite the caudal axis. Whether there is one testis or two remains to be determined.

Habitat: Eel-grass, Biscayne Bay, Miami, Florida, U. S. A. Flemming to glycerine jelly. Fig. 10.

11. Porocoma striata n. sp. i 1 12 13 14 15 16 17. The rather thin cuticle appears to be destitute of setae except at the extremities. The body is traversed nearly from end to end by about ten to twelve wings. Between the wings the transverse striæ seem to be reducible into excessively minute elements. In addition to the cephalic setae, there is a ventral seta-like organ, opposite the sub-cephalic setae and just behind the excretory pore. This is a little stouter, longer, and more blunt than the cephalic setae, and seems to have a special relation to the excretory pore. The mouth is surrounded by relatively thick, minute lips. It is possible that a more or less vestigial pharynx extends back to near the cephalic setae, its presence being indicated by a slight difference in the lining of the canal, and by a break in the musculature. Posteriorly the neck is conoid, anteriorly convex-conoid. No distinct traces of amphids have been seen, but possibly obscure ones exist opposite the bases of the lateral setae. The oesophagus is conoid, then conoid in its posterior eighth. Near the head it is one-half, near the nerve-ring two-thirds, and finally three-fourths, as wide as the corresponding portion of the neck. Its lining is indistinct. There is a flatish cardia, one-half as wide as the base of the neck. The thick-walled intestine is separated from the oesophagus by a column one-half as wide as the base of the neck and becomes at one-half as wide as the body, and would present two to three cells in cross-section. Its cells contain scattered granules of variable size, the largest of which have a diameter about equal to the width of two of the adjacent annules; tessellated effect faint. The tail, which tapers from in front of the anus, is conoid, and then cylindrical in the posterior half, where it is about one-half as wide as at the base. Apparently the elliptoidal caudal glands are packed in a close tandem in the anterior fourth of the tail. The lateral fields are one-half as wide as the body. The elongated, outstretched, granular rosette cell lies one to two body-widths behind the base of the neck. It is two to three times as long as the base of the neck is wide and about one-fourth as wide as long. The broad oblique nerve-ring is accompanied by obscure nerve cells. While both ovaries are essentially behind the vulva, one of them extends forward a distance about twice as great as the corresponding body-diameter, and is then reflexed, and extends backward, so as to lie parallel to the other. The medium-sized, but rather conspicuous vulva is continuous with the ventral surface. The rather strongly ciliated vagina extends inward five-sixths the way across the body. It is possible that the narrow, cylindrical ovaries are reflected for a short distance near their blind ends.

Habitat: Biscayne Bay, from sponges and associated material. Flemming to glycerine jelly. Fig. 11.

II. Order Bolbinia

12. Litonema nudum n. sp. i 1 12 13 14 15 16 17. The presence of the two wings, which begin on the neck and end near the anus, is indicated by two refractive, longitudinal markings, which occupy a space equal to one-fourth to one-third the width of the body. The cuticle is entirely naked. There appears to be a vestigial pharynx nearly as long as the base of the head is wide,—simple, narrow, tubular, obscure. The neck is conoid. Almost on the front of the head, but near its margin, there are two minute, lateral pores, which may possibly be amphids. Connected with these pores are inner tubular elements, which may be followed backward for a considerable distance. The more or less cephalocephalic oesophagus has a very faint, elongated, posterior swelling, one-fourth as wide as the base of the neck. Near the pharynx the oesophagus is one-third, near the nerve-ring one-eighth, and in front of the cardiac swelling one-seventh, as wide as the corresponding portion of the neck. The optical expression of the lining of the oesophagus consists of two distinct, refractive lines, having a distance apart equal to one-tenth the width of the oesophagus. There is no cardia. The thick-walled intestine presents a faint lumen, and becomes at once five-sixths as wide as the body. Anus continuous; rectum inconspicuous. The cells of the intestine are packed with granules of rather uniform size, the largest of which are one-seventh as wide as the body. The coelomic glands are probably one-third as wide as the body. The excretory pore and the duct leading to it are so refractive as to be easily visible.

Habitat: About the roots of the lady's slipper, Cypripedium acaule Linn., sphagnum swamp, Wisconsin, U. S. A. Flemming to balsam. Fig. 12.
The colorless, naked skin displays irregular markings and a finely crenate contour. The colorless, transparent, oral opening is in a truncate head without setae and having a large, shallow depression, the remainder of the cephalopagus being fusiform and in its widest part two-thirds as wide as the neck. For a short distance the intestine is three-fourths as wide as the body and separated from the oesophagus by a not very deep constriction, appearing transparent and almost bulbous. The cardiac cavity is small and the cardia very flat. The large cells composing the intestine are filled with small granules, displaying no very definite arrangement. The narrow, colorless, transparent rectum is three-fifths as wide as the anal body-diameter, and has a distinct lining. The ventral excretory pore is situated as far behind the cardia as the head is in front of it, the duct in the immediate vicinity being very transparent and distinct, and having a distinct lining. The granular lateral fields are one-fourth as wide as the body, and from head to tail a finely crenulate, ciliated wing extends along each lateral line. The tail of the female is conical to the pointed terminus. The unusually large, flat, elevated vulva is two-thirds as wide as the body, and from it the vagina extends backward a distance greater than the body-diameter. The two straight uteri in the only specimen seen contained six to eight eggs, each a little longer than the body width, and measuring 30-60 x 125-140 microns. The ovaries extend two-thirds the distance to the cardia and anus respectively and contain ova arranged single file.

Habitat: Intestine of an earth-worm, Moss Vale, New South Wales, Australia, April, 1924. It is not certain that this species may not be con-specific with one or more of these mentioned by earlier authors under the generic names Angulula, Nemastodum, etc, names also found in earth-worms, but insufficiently described; hence the proposal of a new genus for its reception.

14. Chloronema simplex n. sp. The thin cuticle is entirely naked. The wing, which begins near the head and ends on the tail, is possibly double in structure. There is no cardia. The rather thick-walled intestine is separated from the oesophagus by an indistinct collar one-half as wide as the base of the neck, and becomes at once about three-fifths as wide as the body. It has a faint lumen and presents few cells in cross-section. Anus subcontinuous; rectum inconspicuous. The cells of the intestine contain scattered colorless granules of variable size, the largest of which are one-fifteenth as wide as the body. In the specimen examined the tail was destinated at the next molt to become very much shorter, so that the anus would lie at about 90%, and the tail would therefore be about four times as long as the anal body-diameter. Two sublateral papillae existed on the tail very close opposite each other.

Habitat: Soil about the roots of plants, Arlington Farm, Virginia, opposite the city of Washington, U. S. A. Fleming to glycine jelly. This species, of which but a single young specimen has been seen, has the general appearance of being a deteriorated Cephalobus or Diplogaster. The specimen figured was young and in process of molting. In the left-hand illustration the excretory pore, ex p, is shown in its proper position. Nearly opposite is shown the cast-off duct and pore which has come into its present position by rotation of the loose, shed cuticle. Similarly, in the right-hand figure the sloughed anal opening is shown opposite the anus, an. The caudal pores cluded observation, but that they were present is shown by the two markings at gd, in the cuticle that has been shed. Probably the cuticle has lengthened, as usual, in being shed, and the pores presumably occur not far behind the anus, notwithstanding the failure to see them. Ph, while indicating the position of the pharynx, also indicates an element that comes to the surface anteriorly (amphid?). Fig. X 750 x.
that at last it is about half as wide as the base of the neck. The lining is faint, and there are no refractive breaks in its structure to indicate the presence of vestigial bulbs. There is no distinct cardia. The intestine becomes at once two to three-fifths as wide as the body. It is composed of cells containing scattered groups of granules. The distinct "lumens" instead of appearing as cavities with a refractive lining, as it usually does when a distinct feature, seems to have a different structure about of the same general appearance. From the slightly depressed anus the conspicuous rectum extends a distance about one and one-half times as great as the anal body diameter. The lateral fields are one-third as wide as the body. It appears as if there is a recte cell opposite the posterior portion of the oesophagus. The tail is conical to the blunt terminus, which has a diameter about one-third as great as that of the base of the tail. There are no caudal glands. It is possible there is a pair of subventral papillae immediately behind the anus. A trifle behind the middle of the tail, there are two faint, lateral intercavities close together on one side, one in front of the other, doubtless connected with surface papillae. Ventral from these, it is possible there is a third papilla belonging to the same group. There are probably one or two pairs of subventral papillae near the terminus. The proximal ends of the tapering, very slightly arcuate spicula are bent in a ventral direction so as to appear to lie on the ventral side of the body-axis, and so appear cephalated. The cephalic piece is more strongly refractive than the spicula themselves, the framework of which is not particularly conspicuous.

Habitat: About the roots of Bamboo, Yuma, Arizona, U. S. A. Fig 15, above.

16. Bolbinsia brevisnolot. n. sp. Cuticle of medium thickness, naked. Posterior half of the neck cylindroid, anterior half convex-concoid. Amphids unusually large, with large internal connections that can be followed backward for some distance. The narrow oesophagus continues to have the same diameter until near the posterior, pyriform, cardiac swelling, which is one-half as wide as the base of the neck. Many of the nuclei connected with the cells of the neck are large and well-developed. In the dorsal and ventral fields there are strands that appear to be composed of closely-packed cells. The cardiac bulb has no distinct valve. The spicula is vestigial. In a variety of ways this nemata seems related to the "Mermithidae," for instance, in the structure of the mouth, the cephalic papillae, the amphids, the internal structure of the tissue of the neck and of the body, the absence of spinners, and the short, rounded, broad tail.

Habitat: Soil, about the roots of citrus plants, Florida, U. S. A. Fig 16.

17. Antomicron pellucidum n. sp. 5 x 2.7 x 0.2. Except for the cephalic setae the cuticle is naked. On the ventral side of the distinctly projecting wing there is a subordinate line to be seen throughout the greater portion of the length of the body, which is not as conspicuous as the main part of the wing. Neck conoid. The very minute pharynx (?), apparently conoidal, whether armed or not is unknown. The lip-region has not been examined with success on account of deficient material. That portion of the amphid inside the two ellipsoids more strongly than the tissues elsewhere. The borders of the two amphids approach each other so closely on the dorsal side that they sometimes almost touch, in fact appear to be connected by a special cuticular element. Oesophagus cylindroid for some distance back, and then expanding rather suddenly to form an almost imperceptible swelling near the beginning of the middle third of the neck; thereafter it diminishes almost imperceptibly to near the nerve-ring, then begins to expand gradually until near the end, where it rapidly expands to form an obscure, small, elongated, pyriform cardiac bulb, almost half as wide as the base of the neck. There is a rounded cardia one-fourth as wide as the base of the neck. Considering the size of the oesophagus its lining is prominent. The intestine is separated from the oesophagus by a broad, shallow constriction, and soon becomes half as wide as the body, and apparently would present only two or three cells in cross-section. The lateral fields appear to be nearly one-third as wide as the body. It seems probable that a recte cell occurs at some distance behind the base of the neck, but no excretory pore has been seen. The tail of the male is conoid to near the terminus. The caudal glands are located in an open tendril series in front of and behind the anus. The eight supplementary organs occupy a distance nearly four times as great as the length of the tail; each is a nearly straight, cuticular tube, half as long as the body is wide, arranged at an angle of forty-five degrees with the body axis, and having its distal extremity protruding backward slightly through the cuticle. The organ tapers slightly in the vicinity of the distal end, which is suddenly somewhat ventrally arcuate at the terminus. They are probably prototricous, though they have not been seen in a protruded position. These tubes have a diameter approximately equal to the width of one of the adjacent annules of the cuticle, and their proximal ends show indications of an attachment extending forward. There are a number of species of the inner part of the anus; especially prominent are one or two submedian setae, one on each side of the anus, one-third as long as the anal body-diameter. A little in front of these is another pair, one on each side, of slightly smaller size, and on the tail there are a few similar ventrally submedian setae of smaller size. Spicula a little longer than the anal body-diameter, and tapering to a point in their distal thirds. The accessory piece surrounds the spicula in their distal fourths, and then extends forward to the dorsal side of the body from the middle of the spicula at a small angle. The appearance of the proximal portion of the accessory piece somewhat resembles that of the proximal ends of the spicula, though it is straighter and more solid. From its cephalated proximal end a muscular strand joins the body wall on the dorsal side of the anterior portion of the tail. The posterior testis is the smaller.

Habitat: Marine; Punta Arenas, Pacific Coast of Costa Rica. Unfortunately the single specimen examined is of such a character that the details of the pharynx must be left undetermined. Fig 17
18. *Cyartonema flexile* n. sp. Except for the cephalic setae the cuticle is naked. There appears to be a circle of six, inconspicuous, minute papillae on the margin of the head. The form and structure of the gland at the base of the narrow oesophagus is reminiscent of the salivary glands in Tylenchus. The intestine is made up of cells so arranged that only one to two are required to build a circumference. The parts of these cells are so differentiated that the groups of granules characteristic of the cells occur at intervals equal to one to two body-diameters, and are more or less alternated with finely granular intestinal elements, or what are suspected to be such (see Figure 18, int ?). The tail, tapering from in front of the anus, is conoid then cylindrical in the posterior fifth. Sperm-sac with minute setae. A single caudal gland was seen near the middle of the tail. A few very inconspicuous setae were observed on the tail. Concerning the lateral fields, I was at times uncertain whether the cells marked int were not in some way connected with these fields. From the somewhat elevated vulva, the relatively large vagina leads inward two-fifths the way across the body. The eggs are three to four times as long as the body is wide, and about one-fourth as wide as long. The broad, more or less cylindrical ovaries suddenly taper near the blind end. They contain apparently only four to five ova, arranged single file. The clavate testis is about two-thirds as wide as the body.

**Habitat:** Clean, white sand, in about five feet of water, in a cove near the entrance to Buzzard's Bay, Mass., U. S. A. Sublimatetobalsam. Fig. 18, p. 242; Fig. 19a.

19. *Stilbonema brevicolles* n. sp. Annules plain, retroflex in the posterior half of the body, the reverse in the anterior. Exceedingly short, submedian, slender setae are found throughout the length of the body, six to nine annules apart, those at the extremities being somewhat the longer. Neck cylindroid. Immediately around the mouth there is probably a row of exceedingly minute papillae. In most of the neck the diameter of the oesophagus hardly exceeds the thickness of the cuticle; it finally expands to form a pyriform bulb about three-fifths as wide as the base of the neck. There is no distinct cardia. The very narrow intestine, joined to a depression in the posterior surface of the cardial bulb, becomes at one place about one-sixth as wide as the body, and then enlarges gradually until it is one-fourth as wide. Its cross-section would show two cells. The lateral fields are about one-fourth as wide as the body, and contain numerous nuclei. Nerve-ring oblique. Tail conoid, annuate.

1525. *Stilbonema majus* n. sp. *Spiculas slender. Acorn-shaped* accessory organs (see figure) fast forward, so that the anterior one is a little behind the neck. The cup-shaped part of these organs has slightly different refractive properties from the "acorn" itself, which is plainly innervated. Jamaica, in one foot of water. Sublimatetobalsam. Fig. 19a, p. 242; Fig. 19b.
glands are probably located in front of the anus. No supplementary organs have been seen. There are no caudal papillae, but both in front of and behind the anus there are a number of ventrally submedian setae; five or six on each side of the anterior half of the tail; while an equal number in front of the anus gradually merge into the scattered setae found all over the body. The proximal ends of the rather stout acute spiculae are somewhat disintegrated and set off by a broad and deep constriction. The framework composing the spicula is relatively massive. The rather straight accessory piece is half as long as the spicula. The ejaculatory duct is about one-fourth as wide as the body. There appears to be a single outstretched testis, though there remains a little doubt on this point.

Habitat: Sholo in Kingston Harbor, Jamaica, in about one foot of water. Fig. 20, p. 213. Sublime to balsam.

21. Leptoneonella cincta n. sp. Fig. 244. 3. The contour is more or less serrate, the annules being retroflex posteriorly and the reverse anteriorly. In addition to the cephalic setae there are scattered cervical setae arranged at right angles to the surface and one-third as long as the neck is wide. No somatic setae have been seen. Apparently at every eight to ten annules along the lateral lines there are pores, each with its longest diameter arranged transversely. Seemingly there are six, very minute, more or less amalgamated lips. Posteriorly the neck is cylindroid, anteriorly conoid. Amphids are present in the form of straight transverse slits, one-sixth as long as the corresponding diameter of the head, and located between the bases of the submedian cephalic setae. Their presence and their form is proved by the ribbon-shaped outflow plainly seen issuing from each amphid. The cylindroid oesophageal tube ends behind in a broad, pyriform cardiac bulb, two-thirds as wide as the base of the neck. There is no cardia. The thick-walled intestine is separated from the oesophagus by a collar one-tenth as wide as the neck, and becomes at once one-fourth as wide as the body. Its lumen is indistinct. Its cells contain fine, rather numerous granules of more or less uniform size. Several submedian, slender, tapering, cuticular "thorns" are seen on the tail, each about one-fourth as long as the anal body-diameter. The lateral fields are one-fourth as wide as the body. The nerve-ring is accompanied by obscure nerve cells. The tail is more or less conoid from the anus, but tapers more rapidly in the posterior half. The strong, tapering, acute, colorless spicula are more or less compound in structure and their extremities appear to lie somewhat ventrad from the body axis. The single, slender, rather strong, simple parallel accessory is three-fifths as long as the spicula.

Habitat: Sand and algae near East Drive, east shore of Kingston Harbor, Jamaica. Sublime to balsam. Fig. 22.

III. Order Cytolaimia.

22. Cinctonema, Cephalobellus, Anticyathus. 244. a little, and finally enlarges to form an elongated, pyriform cardiac bulb, three-fourths as wide as the base of the neck. The intestine is very narrow where it joins the anterior face of the cardiac bulb,—hardly $\frac{1}{2}$ as wide as the neck; but at that point the duct is about one-fourth as wide as the body. The lateral fields are about one-fifth as wide as the body and contain nuclei, two of which placed one beside the other side by side would span the field. Tail of the male conoid; on it there are a few setae in front of the anus. The rather slender, acute spiculae are about one and one-fourth times as long as the anal body-diameter.

Habitat: Sand and algae near East Drive, east shore of Kingston Harbor, Jamaica. Sublime to balsam. Fig. 22.

23. Cephalobellus papilliger n. sp. 244. 3. The contour is more or less pyramidal depression one-third as wide as the head. Oesophagus cylindroid, one-fourth as wide as the middle of the neck, joining a pyriform cardiac bulb two-thirds as wide as the base of the neck and containing a distinct valve. Lining of the oesophagus rather faint. The rather thick-walled intestine is three-fifths as wide as the body, and is separated from the neck by a shallow, cardiac constriction. The ventral cuticle is situated just in front of the intestine. From the somewhat elevated anus the tail is conical to the acute terminus. A pair of tail, conical, sub-ventral papillae are located opposite the middle of the spiculum. Taken altogether, the papillae are situated as follows: 1; 1; 1. Spiculum slender, somewhat irregular, twice as long as the anal body diameter, placed at angle of forty-five degrees with the body axis. The ejaculatory duct was of equal length with the testis, and was connected with it by a tube also of the same length.

Habitat: Intestine of the larva of a lamellicorn beetle, from soil under cow-dung, Moss Vale, New South Wales, Australia. 1893.

24. Anticyathus tensocaudatus n. sp. 244. Body wall thick. In addition to cephalic setae there are scattered papilloid cervical setae. Conoid oesophagus at first
by a collum one-fifth as wide as the base of the neck, and becomes more or less gradually three-fourths to five-sixths as wide as the body. Its cross-section is composed of twenty to fifty cells. These cells contain numerous granules of variable size. The tail tapers from in front of the anus; it is first conoid, then cylindroid in the posterior fourth, where it becomes one-fifth as wide as at the anus. There are no caudal glands. Fifteen to twenty almost invisible setae, as long as the cuticle is thick, occur on each ventrally median line on the tail. The longitudinal fields are one-third as wide as the body. Near the excretory pore is an ampulla one-sixth as wide as the corresponding portion of the neck. The nerve-ring is accompanied by obscure nerve-cells. Vulva medium-sized, more or less elevated; vagina non-ciliated. Near the proximal end, each ovary presents a double fissure, occupying a distance equal to one body-width; thence onward the ovaries are outstretched in opposite directions, but not over one-tenth as wide as the body. The eggs occur in the uteri about nine at a time. They are about one-half to two-thirds as long as the body is wide, though they are often as crowded together in the uterine that they appear wider than long. The narrow tapering ovaries contain seventy to eighty ova, arranged single file. The strong, rather simple, stoutish, tapering, rather blunt spicula are as long as the anal body-diameter, and are so placed that their proximal ends, which are ephalised by expansion, appear to lie somewhat dorsal from the body-axis. At their widest part the spicula are one-eight as wide as the corresponding portion of the body; the apophyses are more or less uniform, and one-fourth as long as the anal body-diameter, so that its proximal extremity appears to lie opposite to or dorsal from the axis of the tail. The 25 supplementary organs, hardly more than invaginations, are papilloid and of slight elevation, rather further apart anteriorly, and occupy a distance five to six times as great as the corresponding body-diameter. There is a single papilla-like ventral seta close to the anus.

Habitat: Sand, Coco-plum Beach, Miami, Fla., U. S. A. Fleming to glycerine jelly. Fig. 24, p. 245.

25. **Neurella simplex**, sp. Striae resolvable with great difficulty into secondary elements. The narrow, sharply-defined wings begin near the head and extend on the tail. The cuticle appears to be naked, except that at the base of the amphids there are elements of problematical significance and number. The neck is cylindroid posteriorly, only, conoid anteriorly, convex-conoid toward the head. There seem to be three lips surrounding the somewhat irregular but more or less distinct, relatively small pharynx. Osophagus cylindroid; at first one-half, near the nerve-ring one-third, as wide as the corresponding portion of the neck; its lining is indistinct. The separation between the osophagus and the intestine was not very clear-cut. The thick-walled intestine gradually becomes one-half as wide as the body; its section is made up of two cells containing scattered granules of variable size; the largest about one-eighth as wide as the body. Not until near the middle of the body does the intestine acquire very definite characteristics. Anus more or less elevated. Tail of the male, as far as seen, conoid; apparently only its tip was missing. Located well toward the middle of the body there is a long, granular cell emptying forward;—probably the renette cell. Excretory pore unknown. Nerve-ring oblique, accompanied by distinct cells arranged in groups.

Habitat: "Sea-grass," shoal, two miles off Key West, Florida, U. S. A. Sublimate to glycerine jelly. The view of the tail of the female was slightly foreshortened; the formula must be interpreted accordingly. Fig. 25, p. 246.

26. **Zygonemella striata**, n. sp. In addition to the cephalic setae, scattered on the anterior part of the neck, there is a considerable number of other papillom like setae, some of which are longer than those near the margin of the head. Lips three, massive, but low, faintly ciliated; within these there is a rather broad inner mouth consisting of three soft, low, flat lobes, which appear to be extensions of the tissue of the osophagus. These latter present faint refractive elements, the exoskeleton of minute foldings of the lip tissue, that make possible the great expansion necessary for the distention of the relatively large diatoms constituting the food. In appearance the pharynxy closely resembles the lumen of the osophagus. It would, in fact, be indistinguishable, were it not for the pharyngeal swelling which is half as wide as the head, that is to say, a very little wider than the remainder of the osophagus. Immediately behind the pharyngeal swelling the osophagus diminishes gradually, so that where it passes through the nerve-ring it is about one-fifth as wide as the neck; thence onward it is cylindroid. The lining of the osophagus is a conspicuous feature throughout its length. The tubular cardia is prominent, about one-fourth as wide as the base of the neck, and about one and one-half times as wide as long. The intestine is almost at once fully half as wide as the body and is separated from the osophagus by a broad and deep constriction. Its cross-section probably comprises only two cells. The cells contain scattered granules of small size and rather uniform diameter. The lateral fields, about one-fourth as wide as the body, contain cells packed with fine uniform granules. Renette unknown. The tail of the male is conoid in such fashion that at the beginning of the final third it has a diameter about equal to the width of two of the corresponding annules; thence onward it is very nearly cylindroid. The anus is slightly raised—the posterior lip elevated. The caudal glands are packed in a tandem series opposite the anus and occupy a space somewhat longer than the anal body-diameter; their ducts are narrow. Spicula acute, not quite as long as the anal body-diameter; their width equal to the height of one of the adjacent annules, tapering in the distal fourths to slender, acute points. The posterior testis is only about half as long as the anterior. Ten unicellular glands are prominent features of the anatomy of the male: (1) A pair of elevate glands immediately behind the blind end of the resealed posterior testis. Each of these glands has a length nearly equal to that of the adjacent body-diameter, and empties through a duct extending backward. The ducts have a width somewhat greater than that of one of the adjacent annules. (2) Just behind the pair of glands already mentioned is a second elevate pair of larger size and very similar; these are about half as wide as the body and somewhat longer than the body is wide, and the ducts extending backward from them have a width greater than that of two of the adjacent annules. (3) Behind the second pair of glands there are six small, posterior glands, i.e., a set of three on each side of the body, arranged longitudinallly close together, but having separate ducts, also extending backward. It
has been impossible to determine with exactitude the entire course of the ducts of these various glands, but most of them have been seen to be connected with the rectum, and all are believed to be so connected, though it is possible that some of them may deliver into a common duct before reaching the rectum. As the structure of these glands, the description of one of them will answer fairly well for all the others. In the fixed specimens, the anterior extremity of each contains a spherical nucleus with a strongly staining nucleolus; the nucleus lies in the midst of chromatin matter which stains rather strongly with Acid carmine. The nucleus and chromatin occupy the anterior fourth, or third, of the glandular cell. The remainder of the contents is of a uniformly fine, granular nature. This granulation is also characteristic of all the ducts.

**Habitat:** Punta Arenas, Pacific Coast of Costa Rica. Distomivorous. Sublimate to balsam. Fig. 26, p. 247.

27. **Margonema regens** n. sp. String unaltered on the lateral fields. Cuticle apparently naked, but it is possible that through rough handling cephalic setae may have been broken off, as was the case with some other specimens in the same collection. Lips three and double. Neck cylindroid. Amphids faint. Oesophagus at first two-thirds, near the nerve-ring one-half, and finally two-thirds, as wide as the corresponding portion of the neck; its lining indistinct. There is a faint, rather flat cardia about half as wide as the base of the neck. The cross-section of the thick walled intestine is made up of two cells. Those transparent, elongated cells have very distinct nuclei, but few and small x750 inconspicuous granules. The intestine becomes at once two-thirds as wide as the body; and is separated from the oesophagus by a collum two-thirds as wide as the base of the neck, and has a faint zig-zag lumen. From the anus, the posterior lip of which is elevated, the prominent rectum extends a distance about as long as the anal body-diameter. The conoid tail tapers from the anus. The three ellipsoidal caudal glands lie in a loose tandem in the anterior two-thirds of the tail. There are no caudal setae. The lateral fields are about one-third as wide as the body, and contain both small and large nuclei. At a distance behind the neck equal to twice the width of the body lies the ellipsoidal rectal sete, which is about as long as the body is wide and about half as wide as long. It empties through an ampulla about as long as the neck is wide, and about one-fourth as wide as long. This latter is connected with the excretory pore by a very short duct. The nerve-ring surrounds the oesophagus squarely, and is accompanied by distinct cells apparently not very distinctly arranged. From the somewhat depressed, more or less continuous vulva the tubular vagina extends nearly half way across the body. The vagina is bifurcated, each branch being about half as long as the body is wide. The uterus are narrow. The body is wide. The narrow ovary taper a little, and contain about a dozen ova approximately in single file. At their widest part, the slender, acute spicula are about one-eighth as wide as the corresponding portion of the body. Their acute, cephalic portions, viewed in profile, appear to lie somewhat ventral from the body-wall. The subareate, rather slender, frail, simple accessory pieces are joined together at the anus. The separate spicula is uniform and one-fourth as long as the corresponding body-diameter. There are thirty to forty low, about equidistant supplementary organs, of such a character that the ventral contour becomes crenate when the tail end is incurred; the cuticles are then more or less contiguous. There are a few, scattered ventrally submedian setae on the tail. The acute ends of the spicula are minutely and sharply curved through an angle of 180 degrees at the very tip. One male specimen was seen in which there were two recto-caecal cells, each with a separate duct for some distance.

**Habitat:** Salaverry, Peru. Marine. Sublimate to balsam. Fig. 27, p. 248.

28. **Leptogastrella pellucida** n. sp. Except for the setae near the head and on the tail of the male, the cuticle appears to be naked. The neck is cylindroid posteriorly, becoming faintly convex-conoid toward the rounded head, which may be set off by an almost imperceptible, broad constriction opposite the base of the pharynx. The membraneous lips, are either six in number, or three and each two-pored. The oesophagus is cylindroid. There is an elongated cardia, one-half as long as the body is wide, and about two-thirds as wide as long. The intestine, separated from the oesophagus by a shallow constriction, becomes at once two-fifths as wide as the body, and then diminishes slightly so that it has about one-third the width of the body. Its cross-section would appear to be made up of not more than two cells. The intestine is so narrow as to give the nematode quite an unusual appearance. It is thick-walled and has an exceedingly narrow lumen. Its cells are packed with exceedingly minute yellowish granules. Correspondingly, the body-wall is unusually thick and muscular, and slightly oblique longitudinal striations due to the refractions of the muscular fibres can be seen throughout the length of the body. The lateral fields appear to be about one-third as wide as the body. The recto-caecal has not been seen. Vulva slightly elevated. The outstretched ovary contains forty or more ova arranged single file. The blind end of the ovary lies not far behind the nerve-ring. The eggs occurring in the uterus appear to be about as long as the body is wide and one-third to one-fourth as wide as long. The tail of the male is conoid to near the terminus, where it has a diameter about one-fifth as great as at the anus. 750 Caudal glands are located in the base of the tail. There are no supplementary organs, nor have any special papillae or setae been seen either in front of the anus or behind it. The spicula slide in tubular accessory pieces.

**Habitat:** Marine mud, San Pedro, California, U. S. A. At first glance this
nema appears to be a typical Monhystera, but careful examination fails to reveal any such well-developed amphids as are characteristic of Monhystera. The spicula are quite different in form from the typical spicula of Monhystera. The intestine also is highly peculiar. Occurs also at Woods Hole, Mass. Fig. 28, p. 249.

29. Dactyloaimus equulus n. sp. 17 ~6!99 ~=~}_m~6~--}40I030,...,...,

There is a small cylindroid cardia. The intestine, cuticle naked, separated from the oesophagus by a deep constriction, becomes at once about two-thirds as wide as the body. Its circuit appears to comprise about four cells. The lumen of the intestine presents a refractive and distinct contour. From the inconspicuous, slightly depressed anus, the rectum is considerably shorter than the anal body-diameter. The distinct lateral fields are about one-third as wide as the body and contain numerous cells whose nuclei are arranged in two indistinct rows along the margins of the field, which they fill fairly well. Renette unknown. The description is derived from a single young female, with the vulva in process of development. The tail is conoid in such a fashion that at a distance from the anus about five times as great as the length of the anal body-diameter, where the annules vanish, it has a width about one-sixth as great as at the anus. An indefinite, but probably not considerable portion of the specimen examined was possibly missing. Hence, the above formula may be only approximately correct. The following formula is in terms of absolute lengths expressed in microns: 17 ~6!69 ~=~}_m~6~--}40I030,...,...,

Habitat: Fim marine mud, San Francisco Bay, California, U. S. A. Sublimate to balsam. Fig. 29.

30. Xenolaimus striatus n. sp. 17 ~6!69 ~=~}_m~6~--}40I030,...,...,

There is a conoid cardia. The intestine, cuticle naked, and complicated, the annules rotate posteriorly and the reverse anteriorly. The twelve longitudinal wings extend to near the spinneret, becoming free on the tail. The thick, somewhat digitate lips are united by a membrane. The portion of the head containing the pharynx is prominent and appears as if surrounded by a balustrade composed of the anterior annules of the cervical cuticle. The large, simple, regular, conoid pharynx is fully three-fourths as long as the head is wide. Each of the six lips bears a two-jointed seta, and appears to be armed internally with a slender, flexible element considerably longer than the seta. In the illustration, what appear to represent a minute setae on the foremost annule of the neck are probably the optical expression of an exceedingly tenuous membrane surrounding the head. Although the oesophagus was not plainly seen, it is evident that it is cylindroid as in Trachynema. The intestine becomes at once three-fourths as wide as the body. The anus appears continuous. The cells of the intestine contain scattered granules of variable size, the largest of which are one-half as wide as one of the annules. The conoid tail tapers from in front of the anus and ends in a spinneret.

Habitat: Marina mud from near the government-dredged cut, Biscayne Bay, Florida, U. S. A. Sublimate to balsam. Fig. 30, p. 250.

31. Cytolaimium exilum n. sp. Cuticle thin, without setae except those on the head. Lips with thin distal flaps as in Monhystera. The cylindroid oesophagus is at first three-fifths, near the nerve-ring one-half, and finally three-fifths, as wide as the corresponding portion of the neck. There is a conoid cardia one-third as wide as the base of the neck. The thick-walled intestine, which has a faint lumen, becomes at once three-fourths as wide as the body. Its cells contain scattered granules of variable size, the largest of which, near the neck, are one-fifteenth as wide as the corresponding portion of the body, but near the middle of the nema are one-tenth as wide as the body. The conoid tail tapers rather regularly from somewhat in front of the anus, but faster near the anus. No clear evidence of the presence of anal glands. The lateral fields are about one-half as wide as the body. The narrow nerve-ring is accompanied by obscure nerve cells. From the small, continuous, inconspicuous vulva, a small, more or less weak, non-cylindroid vagina extends inward one-third the distance across the body. In the narrow, tapering ovaries, the ova are arranged single file. Only one egg at a time occurs in each uterus. The eggs are three times as long as the body is wide and appear about three-fourths as wide as the body. The tail of the male is first conoid, then cylindroid in the posterior two-fifths, where it is one-third as wide as at the base. The somewhat stout, rather blunt spicula are strong, non-cylindroid, and so situated that their proximal ends appear to lie opposite the body-axis. There is a refractive disc.. The ejaculatory duct, which is co-extensive with the pre-anal supplementary organs, is one-half as wide as the corresponding portion of the body. The vas deferens is one-half to one-third as wide as the body. Each testis is at first about one-third as wide as the body and cylindroid, but afterwards tapers. The anterior testes is much the longer.

Habitat: Sand-bar opposite Miami River, Biscayne Bay, Fla., U. S. A. Sublimate to balsam. Fig. 31.
252 ORDER CYTOLAIMIA

32a. Rhabdocoma americana n. sp. Type species. Cuticle thin, naked except for the cephalic setae. Lips three. Wall to the pharyngeal cavity in optical section showing three somewhat thickened elements, that are possibly minutely transversely ribbed; these elements, however, are very small and difficult of resolution. Neck somewhat conoid anteriorly. Oesophagus at the nerve-ring two-fifths, as wide as the corresponding portion of the neck, and containing glands, as is indicated by fine granular matter in branched cavities. Cardia more or less spheroïdal, one-half as wide as the base of the neck. The rather thick-walled intestine presents a faint lumen and becomes at once about one-half as wide as the body; its cross-section presents but few cells. Anus continuous; rectum about as long as the anal body-diameter. The intestinal cells contain granules of variable diameter, the largest one-tenth as wide as the body. Doubly refractive granules occur in all parts of the intestine, but are not numerous; these tend to have quadrates contours and do not present St. Andrew's crosses. The tail tapers very gradually throughout, commencing well in front of the anus. Rectette unknown. There is an anterior tuft of branch to the female sexual organ, about as long as the body is wide. From the rather large, more or less depressed vulva the well-developed cutinized vagina extends inward three-fifths the distance across the body. The elongated eggs are twice as long as the body is wide. The broad, cylindrical ovariomy reaches three-fourths the distance back to the vulva and contains very many ova, those of the two-thirds next the uterus being arranged single file. The frail sperm is about one and two-thirds times as long as the anal body diameter and are rather wide apart. Accessory pieces faint. Supplementary papillid, twelve to sixteen, occupying a distance in front of the anus ten to twelve times as long as the body diameter, while a second series of about eight, occur on the neck. The members of the anal series are somewhat farther apart anteriorly, of the cervical series, posteriorly.

Habitat: Sand among mussels, Devil's Island, Woods Hole, Mass. Fig. 32.

b. Rhabdocoma macracanthus n. sp. Very closely resembling the preceding, but differs in the following respects: straight setae, nearly as long as the head is wide, digitate, with a minute setose macro; amphids a trifle farther forward, somewhat elongated, apparently four, submedian, minute, short setae opposite the posterior margin of the amphids; accessory pieces one-half as long as the setae and parallel to them.

Habitat: Sulphurous sand, Bay of Naples, toward Vesuvius, 1888.

33. Didelta maculata n. sp. Cuticle, which is above medium thickness and naked except for the setae on the head, is characterized by the presence of peculiar transversely-elongated refractive subcuticular markings, reminiscent of the bubbles in defective window glass. The simple, subregular, somewhat asymmetrical, nasiiform pharynx is about one-third as wide as the head. On the dorsal side of the base of the pharynx there is a more or less glutoid, low, flat elevation, so that the more or less refractive dorsal wall of the pharynx appears only about half as long as the ventral wall. Posteriorly the neck is cylindrical, anteriorly, more or less conoid. The elliptical amphids are in reality spirals of about one wind. They occur on large, somewhat equilaterally triangular or deltoidal areas on the sides of the head; hence, the name Didelta. The osophagus is at first about three-fourths, near the nerve-ring one-half, and finally two-thirds, as wide as the corresponding part of the neck. The lining is distinctly indicated by a more or less zig-zag, refractive line; the musculature is coarse and colorless. There are no valves, and there is no cardia. The thick-walled intestine, which has a distinct refractive lining, becomes at once three-fourths as wide as the body; its cross-section being composed of about six cells. It is separated from the oesophagus by a cellum one-third as wide as the base of the neck. The cells of the intestine are packed with more or less uniform granules, having a diameter about one-nineteenth that of the body. Arranged in elliptical clusters, they give rise to a distinct tessellation. The wall, which tapers from the anus, is first conoid, then more or less cylindroid in the very narrow posterior half. It really tapers throughout, but is nearly cylindroid in the notocereous part. There is no spinemere. The lateral fields are about one-fourth as wide as the body. The nerve-ring is of medium size, and is accompanied by obscure nerve cells. From the rather inconspicuous, but somewhat elevated, the eutinized vagina leads inward two-thirds the distance across the body. The tapering ovaries were not favorable to detailed observation.

Habitat: "Sea-grass," shoal, two miles off Key West, Florida, U. S. A. Fleming to glycerine jelly. Fig. 33.

34. Dasynema azalei n. sp. Striae resolvable into secondary, elongated elements. Annules retrace posteriorly, and the reverse anteriorly. Cuticle naked except for the setae on or near the head. Lips three, more or less distinct, thin, apparently acute, possibly conoid, mobile; the appearance is that of three segments of the head, each armed at the summit with a short, inward-pointing, dark-cutinized spine, having an inward stroke. There does not appear to be a distinct cardia, but a number of small cells forming the beginning of the intestine are manifestly different in structure from those directly behind. The rather thin-walled intestine, which has a more or less distinct, refractive lumen, soon becomes two-thirds as wide as the body, and its cross-section is composed of two to four cells in which there are few or
ORDER CYTOLAIMIA

254

no granules

From the anus, the posterior lip of which is elevated, the prominent rectum leads inward a distance one and one-half times as great as the anal body-diameter. The tail is sub-conoid,—at first conoid, then more or less cylindroid. The elongated caudal glands appear to lie in the anterior half of the tail.

Habitat: Eel-grass, Woods Hole, Mass., U. S. A. Sublime to balsam. Described from a young specimen. Fig. 346, p. 253; Fig. 347.

35. Linhomoella exilis n. sp. The shorter cephalic setae are differentiated at the extremity, suggesting that they bear special sensory organs. Cuticle naked except for the setae on or near the head. Lips apparently confluent. Possibly there are papillae immediately around the mouth opening. It sometimes appears as if there is a minute pharynx like that of Monhystera, but this may be a deception due to the structure of the front part of the oesophagus; possibly there is no true buccal cavity. Neck cylindroid. The more or less cylindroid oesophagus is at first three-fifths, near the nerve-ring two-fifths, and finally two-thirds, as wide as the corresponding portion of the neck. It is colorless and has a fine musculature. The cylindroid cardia is three-fourths as wide as the neck. The intestine, which is separated from the oesophagus by a collum three-fifths as wide as the base of the neck, becomes at one three-fourths as wide as the body. Near its anterior end, however, there is a broad, shallow constriction, in which region its lumen is faint. Anteriorly the walls are thick, while posteriorly they are thin. A cross-section of the intestine is probably made up of about three cells. These cells contain scattered granules of variable size, the largest of which are about one-twelfth as wide as the body and appear to have the structure of spherical shells. The arcuate tail tapers from the anus to the terminus, where it is one-fourth as wide as the anus. Caudal glands were not seen.

The cephalic setae are very numerous, and are of variable size, the largest having a diameter equal to the width of two of the adjacent annules. They have the appearance of hollow shells, more or less thick-walled. The cephalic glands were not seen.

The more or less cylindroid oesophagus is at first three-fifths, near the nerve-ring two-fifths, and finally two-thirds, as wide as the corresponding portion of the neck; its lumen is subdistinct. Its musculature fine and colorless. There is a hemispherical cardia, one-fourth as wide as the base of the neck. The thick-walled intestine, which is set off by a collum one-fourth as wide as the base of the neck, becomes at one two-thirds as wide as the body. Anteriorly its lumen is faint, but posteriorly it is distinct. The cross-section of the intestine is composed of about three cells. The granules contained in these cells are scattered to numerous, and are of variable size, the largest having a diameter equal to the width of two of the adjacent annules. They have the appearance of hollow shells, more or less thick-walled. The posterior tail tapers from the anus to the terminus, which is one-third as wide as its base. Though the caudal glands were not clearly seen, they appear to be broadly sacculated and to be arranged in a close tandem behind the anus in the anterior half of the tail. There appear to be about three slender, somewhat cylindroid, subacute setae on each submedian line on the tail. The lateral fields are two-fifths as wide as the body. The body of one cell begins at the cardia and extends backward a distance equal to the length of the neck. It is two-fifths as wide as the body, and, of course, is not reflected. It is granular and possesses a large nucleus. The elongated ampulla is one-third as wide as the head and extends through a short duct near the base of the lips. Vulva more or less continuous, small; cutinized vagina of medium size. The thin-shelled, elongated eggs are probably five to six times as long as the body is wide. According to the condition of the uterus, the broad tapering ovaries reach from three-fifths to the whole of the distance back to the vulva. They contain about a dozen ova arranged more or less single file, except near the blind end.

Habitat: Sand-bah, Biscayne Bay, off the mouth of the Miami River, Florida, U. S. A. Fleming to gynecarial jelly. Fig. 35, p. 254. The almost imperceptible constriction occurring in the cephalic region, as shown in the illustration, is somewhat more marked when seen dorso-ventrally; the amphids are located in the midst of a broad and shallow depression.

36. Nannolaimus guttatus n. sp. Fig. 34, p. 253; Fig. 345. Cuticle of medium thickness, naked except for the cephalic setae, of which there is a circle of ten, with a circle of six immediately preceding it. There are, however, a few, scattered setae on the neck, one-third as long as the neck is wide, arranged at right angles to the surface. Lips confluent, very small, thin and minute, probably six in number. No labial papillae have been seen. Pharynx almost non-existent, simple, conoid. Neck cylindroid. The oesophagus is at first one-half, near the nerve-ring two-sevenths, and finally two-thirds, as wide as the corresponding portion of the neck; its lumen is subdistinct. Its musculature fine and colorless. There is a hemispherical cardia, one-fourth as wide as the base of the neck. The thick-walled intestine, which is set off by a collum one-fourth as wide as the base of the neck, becomes at once two-thirds as wide as the body. Anteriorly its lumen is faint, but posteriorly it is distinct. The cross-section of the intestine is composed of about three cells. The granules contained in these cells are scattered to numerous, and are of variable size, the largest having a diameter equal to the width of two of the adjacent annules. They have the appearance of hollow shells, more or less thick-walled. The cephalic glands were not seen.

The more or less cylindroid oesophagus is at first three-fifths, near the nerve-ring two-fifths, and finally two-thirds, as wide as the corresponding portion of the neck; its lumen is subdistinct. Its musculature fine and colorless. There is a hemispherical cardia, one-fourth as wide as the base of the neck. The thick-walled intestine, which is set off by a collum one-fourth as wide as the base of the neck, becomes at once two-thirds as wide as the body. Anteriorly its lumen is faint, but posteriorly it is distinct. The cross-section of the intestine is composed of about three cells. The granules contained in these cells are scattered to numerous, and are of variable size, the largest having a diameter equal to the width of two of the adjacent annules. They have the appearance of hollow shells, more or less thick-walled. The cephalic glands were not seen.
ORDER ISOLAIMIA

IV. Order Isolaimia

27. Rhadinema flexile n. sp. (Fig. 27. x 200.) Cuticle three-jointed; cuticle otherwise naked. The thick, small lips confluent. Pharynx exceedingly minute, two-thirds as deep as the head is wide; wall characterized by six longitudinal elements of minute size, exactly parallel to the axis of the head, so that the pharynx appears to be a more or less shallow, cylindrical or conical cup, two-thirds as deep as wide. The lining of the oesophageal tube is more or less modified as far back as the base of the amphids. The circumference of the amphid is almost imperceptibly broken on the dorsal side. The somewhat cylindrical oesophagus is almost shops is three-fifths, near the nerve-ring one-half, and finally two-thirds, as wide as the corresponding portion of the neck. The lining is subdistinct. There is a more or less hemispherical cardia three-fifths as wide as the base of the neck. The thick-walled intestine, which has a distinct, refractive, more or less zig-zag lumen, becomes at once three-fourths as wide as the body. Its cells are packed with uniform colorless granules of variable size, the largest of which are one-sixteenth as wide as the body. They do not give rise to more than a faint transillumination. The tail is conoid. The more or less narrow elongated caudal glands are arranged in a loose tendon behind the anus in the anterior third of the tail. The elongated rosette cell lies at a distance behind the base of the neck equal to twice the body-diameter; it is one-body-width long, about one-third as wide as long, and contains a rather large nucleus, The rather broad oblique nerve-ring is accompanied by somewhat obscure nerve cells.

Habitat: Clear, "white" sand, 3 feet of water, cove at the entrance to Buzzard's Bay, Mass., U. S. A. Sublime to balsam. Fig. 27.

28. Protelus aureus n. sp. (Fig. 28. x 200.) Lateral papillae. Pharynx very long and tubular. Three-jointed; cuticle otherwise naked. The thick, small lips confluent. Pharynx exceedingly minute, two-thirds as deep as wide as the head is wide, and has the peculiarity of lying close to the ventral side of the body. The length of the oesophageal tube is only one-fourth the body-diameter. No labial papillae. The oesophagus appears to be a more or less shallow, cylindrical or conical cup, two-thirds as deep as wide. The lining of the oesophageal tube is more or less modified as far back as the base of the amphids. The circumference of the amphid is almost imperceptibly broken on the dorsal side. The somewhat cylindrical oesophagus is almost three-fifths, near the nerve-ring one-half, and finally two-thirds, as wide as the corresponding portion of the neck. The lining is subdistinct. There is a more or less hemispherical cardia three-fifths as wide as the base of the neck. The thick-walled intestine, which has a distinct, refractive, more or less zig-zag lumen, becomes at once three-fourths as wide as the body. Its cells are packed with uniform colorless granules of variable size, the largest of which are one-sixteenth as wide as the body. They do not give rise to more than a faint transillumination. The tail is conoid. The more or less narrow elongated caudal glands are arranged in a loose tendon behind the anus in the anterior third of the tail. The elongated rosette cell lies at a distance behind the base of the neck equal to twice the body-diameter; it is one-body-width long, about one-third as wide as long, and contains a rather large nucleus. The rather broad oblique nerve-ring is accompanied by somewhat obscure nerve cells.

Habitat: Clear, "white" sand, 3 feet of water, cove at the entrance to Buzzard's Bay, Mass., U. S. A. Sublime to balsam. Fig. 27.

29. Colpocella fontina n. sp. (Fig. 29. x 200.) Cuticle three-jointed; cuticle otherwise naked. Pharynx very long and tubular. Three-jointed; cuticle otherwise naked. The thick, small lips confluent. Pharynx exceedingly minute, two-thirds as deep as wide as the head is wide, and has the peculiarity of lying close to the ventral side of the body. The length of the oesophageal tube is only one-fourth the body-diameter. No labial papillae. The oesophagus appears to be a more or less shallow, cylindrical or conical cup, two-thirds as deep as wide. The lining of the oesophageal tube is more or less modified as far back as the base of the amphids. The circumference of the amphid is almost imperceptibly broken on the dorsal side. The somewhat cylindrical oesophagus is almost three-fifths, near the nerve-ring one-half, and finally two-thirds, as wide as the corresponding portion of the neck. The lining is subdistinct. There is a more or less hemispherical cardia three-fifths as wide as the base of the neck. The thick-walled intestine, which has a distinct, refractive, more or less zig-zag lumen, becomes at once three-fourths as wide as the body. Its cells are packed with uniform colorless granules of variable size, the largest of which are one-sixteenth as wide as the body. They do not give rise to more than a faint transillumination. The tail is conoid. The more or less narrow elongated caudal glands are arranged in a loose tendon behind the anus in the anterior third of the tail. The elongated rosette cell lies at a distance behind the base of the neck equal to twice the body-diameter; it is one-body-width long, about one-third as wide as long, and contains a rather large nucleus. The rather broad oblique nerve-ring is accompanied by somewhat obscure nerve cells.

Habitat: Clear, "white" sand, 3 feet of water, cove at the entrance to Buzzard's Bay, Mass., U. S. A. Sublime to balsam. Fig. 27.
40. *Pseudolaimus papillatus* n. sp. Cuticle thin naked. Near the middle of the body the very narrow, exceedingly minutely cutaneous wings occupy a space about equal to the width of two annules of the cuticle. Neck conoid. From the ambulac a distinct internal extends inward and backward a distance twice as great as the width of the corresponding portion of the neck. Lip-region difficult to decipher. Cephalic cuticle very thick, especially near the base in profile and in optical section there are seen connected with this thickened portion of the labial cuticle elements that extend forward over the vestibule. At first sight these extensions appear to be thin, cutinized flaps, that are very minutely transversely striated. A careful examination, however, appears to indicate that they may have somewhat the structure of cuticle, inasmuch as a short distance behind the sphen, which are decidedly sharp, the inner contours curve in toward the axis of the head, and the longitudinal section of the elements, including the bases, above described, appear claw-shaped. The dorsal and ventral elements, thus viewed, are very much alike. Concentrating attention on either lateral surface of the head one finds, opposite the axis, two elements which extend forward parallel to each other and then bend toward the axis, arching inward to meet the dorsal and ventral elements already described, and appear to be the median elements of lateral labial organs. These elements are not so finely striated as the labial elements first mentioned, and appear to be slightly darker. The napiform vestibule leads to the pharynx, the entrance to which seems to be nearly closed by a very slight curvature on the anterior part of one of the cutaneous elements marking its contour. The esophagus diminishes slightly in diameter as it passes backward, so that its middle part is hardly two-fifths as wide as the corresponding portion of the neck. It then diminishes more rapidly, so that just in front of the cephalated proximal ends lie ventrad from the body axis. The frill, slender, cutaneous accessory piece is parallel to the sphenula and one-third as long; at its proximal end it has a very small, backward-pointing apophysis from which muscular strands pass forward to the dorsi-caudal premedian lines and backward to the ventral field near the middle of the tail. The six papilliform or mammiform, sub-equidistant supplements occupy a space about three times as great as the anal body-diameter. Each comprises about six annules of the cuticle and has the same slightly cutaneous contour as the ventral surface. The tail bears four pairs of small, conoid papillae, a little behind its middle; one dorsi-caudal median, one lateral, one ventrally median and one ventral. 

Habitat: Soil, Plummers Island, Potomac River, Virginia, U. S. A. Fleming to glycerine jelly. Fig. 41.

42. *Coinonema punctatum* n. sp. Lipsthick. Neck conoid. Eye-spots two, far apart, brown to yellow, solid, with backward connections. The cylindrical esophagus is at first one-half, at the nerve-ring one-third, and finally one-third, as wide as the corresponding portion of the neck; lining subdistinct. There is a cylindrical esophagus one-fifth as wide as the base of the neck, becomes at once three-fourths as wide as the body. Anteriorly it is thick-walled, posteriorly thin-walled. Its cross-section is composed of four to five cells. These cells contain numerous granules packed together in such a way as to give rise to a faint tessellation. The granules are of variable size, the largest being one-tenth to one-sixteenth as wide as the body. The anus is continuous, the rectum three-fourths as long as the anal body-diameter. The conoid tail tapers from the anus to the rather minute spiniform. The three, broadly-concave caudal glands lie in a close tandem in the anterior third of the tail. The ellipsoidal repertory cell stretches along behind the base of the neck for a distance equal to twice the width of the body; it is one to two thirds as long as the neck. The description is derived from a specimen much too young to give any indication as to the position and form of the sexual organs. The measurements must be correspondingly interpreted.

Habitat: From green-house soil, Ann Arbor, Mich., U. S. A. Fixed in Flemming; examined in water. Fig. 42.
applied part one-third as long as the spicula, and projecting at right angles to this is a uniform, blunt apophysis, one-half as long as the anal body-diameter having its proximal end opposite the axis of the tail. The testes are wide and more or less tapering.

Habitat: Key West and Biscayne Bay, U.S.A., on algae; Fleming to glistening jelly. Fig. 42, p. 259.

43. Rhynchoema cinctum n. sp. Annulus of the cuticle retrose posteriorly, the reverse anteriorly. Neck cylindrical, very rapidly narrowing just behind the head, and thence near cylindrical, so that the entire head forms a kind of flexible beak. There are no oocytes. Conoid oesophagus at the nerve-ring two-fifths, and finally one-half, as wide as the corresponding part of the neck; it has a fine colorless musculature with no indication of glands. The lining is indistinct. There is no cardia. The intestine sets off by a collar one-fifth as wide as the neck, becomes at once three-fourths as wide as the body. It has a distinct refractive lumen and is thick-walled; its cross-section presents two to three cells. From the continuous

Habitat: Salaverry, Peru, near low tide mark; marine Rhynchoema is composed of a considerable number of species occurring in at least the Atlantic and Pacific Oceans. With low powers it is difficult to distinguish the head end from the tail end. The flexible, narrow head suggests the functions of a beak. One may imagine it to probe the depths of some receptacle containing food, for instance the one-third of an algal oogenum. However, nothing is known with certainty concerning the food habits. Fig. 43.
ORDER ISOLAIMIA

one-third as wide as the middle of the neck, connected with the excretory pore by a short, rather sharply curved, minute duct. The caudal glands are located in a tandem series a considerable distance in front of the anus, that which is farthest forward being somewhat farther from the anus than is the spinercell. The tail is conoid in the anterior three-fifths in such a fashion that at the beginning of the fourth fifth it has a diameter about one-fourth as great as at the anus; thence onward the tail is cylindrical to the terminus which bears a slightly dilated spinercell. From the three-fours of the vulva the rapidly stoutened vagina leads inward more than half way across the body. The ovaries reach about two-thirds the distance back to the vulva, as far as in the only specimen so far examined, which was a rather immature female. Nothing is known concerning the number, size and structure of the eggs.

Habitat: Green algae, Carlisle Bay, Jamaica. Fig. 45, p. 261.

46 Cynura xinema n. sp. The rather thick cuticle is naked. The two wings, occupying a space one-third as wide as the body, begin near the head and end on the tail. Pharynx very strongly reminiscent of that of Phileurus,—is continued by a longer posterior part, whose presence is indicated mainly by alterations in the lining. This part, however, is rather easily distinguished from the oesophagus proper. Neck cylin-droid posteriorly, convex-conoid anteriorly. The cylin-

Habitat: Seaweed, washed up at Ocean Beach, Miami, Fla., U. S. A., after a storm. Fieamning to glycerine jelly. Only a single specimen seen. Fig. 46, p. 262.

47 Xinema perfectum n. sp. Neck conoid. Somatic setae papilloid, or nearly so; cuticle becoming much thinner in the region of the lateral organs, thickening again in front of the anus; the peculiarly thickened and becoming again as thick as ever on the front of the head. The oesophagus continues to have the same diameter until after it passes through the nerve-ring, when it begins to expand gradually, until finally it is nearly three-fourths as wide as the base of the neck. The two ventrally sub-
named organs of the oesophagus appear to contain glands,—at least in each there extends from near the posterior end of the oesophagus forward a minute duct, which stains distinctly with carmine. This duct can be traced at least as far as the nerve-ring. The tail does not appear to be as long as the body; the lateral fields are about one-third as wide as the body. The nerve-ring surrounds the oesophagus squarely. The tail tapers from considerably in front of the anus, being convex-conoid in such a fashion that at the beginning of the final fifth it has a diameter about one-fourth as great as at the anus, or even less; thence onward, the tail expands a little. The caudal glands are located near the anus. From the depressed vulva, the vagina leads inward more than half way across the body, where it joins the two symmetrical placed uteri; its lateral walls are distinctly cuti-

47 Cynura, XINEMA

Habitat: Seaweed, washed up at Ocean Beach, Miami, Fla., U. S. A., after a storm. Fieamning to glycerine jelly. Only a single specimen seen. Fig. 46, p. 262.

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Cynura, XINEMA
49. Ceramonema attenuatum n. sp. (antic.) Each annule of the thick, transparent, naked cuticle is made up of eight elements so fitted together as to be reminiscent of corrugated roofing-tiles; hence, the name “Ceramonema” (see Fig. 48). Neck cylinder, with minute, somewhat forward-pointing setae one-fourth as long as the annules are wide. The setae occur in longitudinal rows, one on each annule, but whether on each of the longitudinal lines is problematical. Lips amalgamated. It is probable that there are minute papillae a little in front of the anterior row of cephalic setae. The very narrow pharynx joins the oesophageal lumen with little alteration. The oesophageal gradually narrows to near its posterior part, becoming at its narrowest point about one-fourth as wide as the neck; hence, forward, however, it expands so that where it joins the intestine it is about half as wide as the base of the neck. There is no distinct cardia. The thin-walled intestine becomes at once two-thirds as wide as the body. Possibly its cross-section is composed of as few as three or four cells. Anus inconspicuous; rectum fully twice as long as anal body-diameter. Salivary glands unknown. The renette appears to be a unicellular gland located immediately behind the cardiac constriction; it is about half as long as the body is wide, and, as usual, tapers anteriorly to join the narrow excretory tube. The excretory pore is perhaps just to the rear of the nerve-ring. It is very difficult to observe the longitudinal fields, owing to the highly refractile nature of the elements composing the cuticle. These latter join each other in such fashion as to give rise to eight longitudinal lines, two of which are, of course, sublateral and span a distance equal to about one-third the width of the body. The nerve-ring surrounds the oesophagus near where its diameter is the smallest; thence, it passes anteriorly to join the narrower part of the intestine. The nerve-ring joins the rectum. From the depressed and inconspicuous rectal vacuole the intestine leads inward nearly half way across the body. The reflected portions of the ovaries reach well back toward the vulva. The eggs are egg-shaped and narrow, though no specimens have been containing well-matured eggs. Habitat: Mud, shallow waters of Kingston Harbor, Jamaica. Sub-limate to balanus. Fig. 49.

50. Ommatobolonea brevicollis n. sp. (antic.) Cuticle rather thin, ruffled, its striations more easily resolvable into rows of longitudinal markings near the extremities. Wings faint. No labial papilla. Amphids yellowish. Oesophagus at the nerve-ring one-half as wide as the middle of the neck; thereafter it expands somewhat, so that finally it is about two-thirds as wide as the base of the neck. The oesophagus has a somewhat wavy lining. There is a narrow, elongated cardia, nearly half as long as the body is wide. The intestine, set off by a deep constriction, becomes at once about three-fourths as wide as the body. The lateral fields appear to be about one-fourth as wide as the body. There is a single ovary, extending forward. From the more or less conical, compressed with the straight uterus, which contains elongated eggs, twice as long as the body is wide and about as wide as long. The narrow ovary is first cylindrical, then tapering. The larger ova are arranged single file; toward the blind end, however, the ova are arranged irregularly. The conidion, arculate tail extends from the anus, and, from somewhat in front of it. The three elliptical cardia glands lie in a loose mass in the anterior half of the tail. The tail of the male is arculate and conoid to the spinneret, which is one-sixth as wide as the base of the tail. No supplements, though there are inconspicuous setae on the submedian lines, both behind and in front of the anus. The dark rather slender spiculae attain their greatest width at their broad middle parts. Accessory piece nearly as long as the anal body-diameter. Near the bases of the spicula the accessory piece takes on a sigmoid contour, and this portion is connected with the body wall both anteriorly and posteriorly by strands of muscle. The ejaculatory duct is about one-third as wide as the body.

BOLBONEMA, OMICHONEMA

lining is more strongly developed in the bulb than it is elsewhere. There appears to be an elongated cardia,—perhaps one-third as long as the neck is wide. The intestine begins as a narrow tube only about one-fourth as wide as the base of the neck, and enlarges gradually so that near the middle of the neck it is about one-half as wide as the corresponding portion of the body. For a distance behind the bulb as great as the body-diameter, the cells of the intestine contain nuclei which stain more strongly with carmine than do any of the neighboring cells. Thence forward the cells contain granules of variable size, the largest being larger than any of the nuclei in any of the adjacent cells. The intestine shows about four cells in cross-section; their contents are so disposed that there is a distinct tessellated effect. Anus slightly raised; the rectum as long as the anal body-diameter. There appears to be no doubt about the existence of a unicellular rectal cell just behind the neck, but the position of the excretory pore is unknown. Lateral fields about one-third as wide as the body. Tail conoid. From the slightly raised vulva, the vagina leads inward fully one-third the distance across the body. The eggs appear to occur one at a time in each uterus. They are fully twice as long as the body is wide, and considerably less than half as wide as long. It seems probable that segmentation sets in before the eggs are deposited.

Habitat: Mud, shallow waters of Kingston Harbor, Jamaica. Sub-limpet to balanus. Fig. 49.
**ORDER ISOLAIMIA**

*Habitat:* Ocean beach-sand, vicinity of Los Angeles, Calif., U.S.A., near low tide mark. Fig. 59, p. 266.

51. *Halosoma macrocarpa* n. sp. The naked cuticle is very finely and somewhat irregularly reticulated upon the head. Outer row of cephalic setae stout, few in number, thin, flag-like. Pharynx somewhat deeper than the base of the head is wide. The pharynx has a faint trigonous framework, the three, slender, longitudinal elements of which are split behind (and also less conspicuously in front), the branches thus made bowing round together; this imparts to the wall of the pharynx, opposite the beginning of the posterior fourth, a junction-like effect. As a whole the pharynx is much like an elongated and naked and weakened Oncholaimus pharynx distalitum of onchius. The cylindrical to conoid oesophagus near the nerve-ring is three-fifths, and finally two-thirds, as wide as the neck. The distinct refractive lining appears to be composed of two to three faint elements, occupying a space three-fifths as wide as the oesophagus; the musculature is coarse. Probably glands are present in the oesophageal tissues. There is a more or less hemispherical cardia, one-third as wide as the neck. The thick-walled intestine is set off by a constriction one-third as wide as the base of the neck, and becomes at once two-thirds as wide as the body. In cross-section it is composed of about twelve cells. The rather inexpressive rectum is as long as the anal body-diameter. The cells of the intestine contain scattered, colorless granules, of variable size, the largest of which are one-twentieth as wide as the body; the larger granules darken in Fleming's solution. The tail is first conoid, and then cylindrical in the posterior two-thirds, where it is one-third as wide as at the base. It tapers from in front of the anus to the terminus, which is apparently devoid of spinaret. The lateral fields are three-fifths as wide as the body; their margins are rather distinctly indicated by the abrupt beginning of the longitudinal musculature. Rennete unknown. Nerve ring accompanied by obscure nerve cells. From the large, conspicuous, some- what elevated vulva the large, tubular to conoid, non-cutinized vagina extends obliggerly backward a distance equal to the body-diameter. The uterus is twice as long as the body is wide, and contains four to seven eggs, which are probably deposited after segmentation begins. The narrow ovary tabets but little, and contains about thirty ova arranged single file. The sub-ovaries, rather simple, frill, blunt spicula are one-eighth as wide as the body; viewed in profile their non-ephalated proximal ends appear to lie dusad from the body-axis. The single, more or less straight, very slender, frill, simple, parallel accessory piece is one-third as long as the spicula. The fifteen to eighteen very inexpressive sub-ephalid, papillid, ventral supplementary organs occupy a space in front of the anus seven times as long as the body-diameter; the posterior one lies opposite the middle of the spicula. The distance between these organs is about one-fourth of one body-diameter. For each supplement there is a "nerve-ending" that appears to project more or less. The sperm cells are long and cylindrical.

*Habitat:* Sand inside government cut, Biscayne Bay, Florida, U.S.A. Fleming to glycerine jelly. Fig. 51.

52. *Halosoma epipheum* n. sp. There are a few, very inconspicuous cervical setae, one-third as long as the neck is wide. Cephalic setae three-jointed (Fig. 1, 3, 8). Lips three, possibly double. Neck more or less cylindrical. Oesophagus cylindrical, with an almost imperceptible cardiac swelling; at the nerve-ring four-fourths, and finally three-fourths as wide as the corresponding portion of the neck. The sub-distinct lining of the oesophagus is optically expressed by refractive lines occupying a space two-fourths as wide as the organ itself. The colorless musculature is rather coarse. No cardia has been noted, but the intestine is at first more refractive in its lining, and otherwise altered. The thick walled intestine is set off by a colomn one-fourth as wide as the neck, and has a faint, but somewhat refractive lining. It soon becomes two-thirds as wide as the body, and in cross-section is composed of few cells. From the anus, the posterior lip of which is elevated, the rather inexpressive rectum leads in a distance three-fourths as long as the anal body diameter. The intestinal cells contain scattered granules of variable size, the largest of which are about one-tenth as wide as the body; they darken on treatment with Fleming's solution, and are strongly refractive in glycerine jelly. The conoid tail tapers from the anus. The broadly sacate cuticular glands, three in number and relatively small, form a close tandem in the anterior eighth of the tail. The posterior half of the tail bears eight pairs of ventrally submedian stiff setae. The rather fusiform, non-granular receptile cell lies on the ventral side of the body a little behind the base of the neck; it empties through a rather conspicuous ampulla one-third to one-fourth as wide as the corresponding portion of the neck. The nerve-ring is of medium size and is accompanied by obscure nerve cells. The long, conoid, more or less hemispherical cardia, one-third as wide as the neck. The thick-walled intestine is set off by a constriction one-third as wide as the body; in cross-section it is composed of about twelve cells. The rather inexpressive rectum is as long as the anal body-diameter. The cells of the intestine contain scattered, colorless granules, of variable size, the largest of which are one-twentieth as wide as the body; the larger granules darken in Fleming's solution. The tail is first conoid, and then cylindrical in the posterior two-thirds, where it is one-third as wide as at the base. It tapers from in front of the anus to the terminus, which is apparently devoid of spinaret. The lateral fields are three-fifths as wide as the body; their margins are rather distinctly indicated by the abrupt beginning of the longitudinal musculature. Rennete unknown. Nerve ring accompanied by obscure nerve cells. From the large, conspicuous, somewhat elevated vulva the large, tubular to conoid, non-cutinized vagina extends obliquely backward a distance equal to the body-diameter. The uterus is twice as long as the body is wide, and contains four to seven eggs, which are probably deposited after segmentation begins. The narrow ovary tabets but little, and contains about thirty ova arranged single file. The sub-ovaries, rather simple, frill, blunt spicula are one-eighth as wide as the body; viewed in profile their non-ephalated proximal ends appear to lie dusad from the body-axis. The single, more or less straight, very slender, frill, simple, parallel accessory piece is one-third as long as the spicula. The fifteen to eighteen very inexpressive sub-ephalid, papillid, ventral supplementary organs occupy a space in front of the anus seven times as long as the body-diameter; the posterior one lies opposite the middle of the spicula. The distance between these organs is about one-fourth of one body-diameter. For each supplement there is a "nerve-ending" that appears to project more or less. The sperm cells are long and cylindrical.

*Habitat:* Sand bar, opposite the mouth of the Miami River, Biscayne Bay, Florida, U.S.A. Fleming to glycerine jelly. Fig. 52.
**Pseudolellia**

269268

**ORDER ISOLAIMIA**

4:8

10:2...?~2~?4-~s

~6,.>?8mm

53aPseudolellacephalatan.Sp..

2;833...3.:138 27 Cuticlenaked;

wingsopticallyexpressedintheformofcloselyapproximated,indistinctlongitudinalines.
Theunusuallylongamphidsareofsuchacharacterastobemistakenasfirstforwings.

Behindthenecktheamphidsgraduallynarrow,so

thatnowhereinfrontofthemiddleofthebody,wheretheyend,theirwidth

isonlyaboutone-thirdasgreatasthebaseofthepharynx.

Neck

conoid.

Cuticlasnarrowthinnyonthehead.

Lipsthick;six,orthreeandtwo-

setcp!J(4J'7br6J

parted.

Internallythelipsarearmedwithsixveryminute

odontia(?),apparentlyhavinganoutwardstroke.

From

theexpandedbaseofthe

pharynxmusculartubesareseen

passingtothefront,clearlyindicatingthattheentirestructure

canbemovedforward;suchmovementwouldbe

entirelyinaccordwiththestructureofthelabialregion.

Theoesophagussub-uniform,aboutone-sixthaswide

asthebaseofthead.

Atitswidest,i.e.,towardthefront,thepharynx

isconsiderablythickerthanthedorsal.
Theexonucleosisoftheintestine

appearsbemadeupoffewcells,perhapsonlytwoorthree.
Thegranules

inthecentralregion,thelargestofwhicharehalfaswideasthenucleus

oftheretentioncell,areaveryconspicuousfeatureandgiverisetoveryindistinct

tessellatedeffect.

Initsanteriorhalfthet-liisconoidfromtheanus,atmid

ofthead;thathalfisaboutone-thirdaswideasthebase.

Henceforward,ittapersbutlittle

andendsinasmoothlyrounded,unarmedapex.

Therearenocaudalsetae.

Caudalglandsoccurintheanteriorpartofthetail.

Lateralfieldsindistinct,

apparentlyone-thirdaswideasthebody.

Bothbeforeandbehindthere
terettcelltherearebodysofunknownsignificancethatspellwithcarinae.

Nuclei

oftheretentioncelldistinct,slunginagroupofprotoplasmonicnetwork.

Behind

there

terettcellisasplindle-shaped,distinctlynucleatedcellfullyone-thirdaswide

asthebodyandabouttwiceaslongasthebody.

Stillsfartherback,aftera

considerableinterval,thereisanothersimilarcelloflarger

size;thetwolattercellseemconnectedbyanarrowprocess,

andtheantiercellpresentsanarrowprocess

extendingforward.

Spiculas

form,someoneandone-half

timessolongastheanaldiameter.

Theirproximalendsratherprominentlyandobliquelycleftby

expansion.

Proximalendalittledorsalfromthebodieside.

Thespicula

taperatoafoilikeapontointhedistalfourthstheircutinizedframework

isculus;attheiirwidestpart,themiddlepart,thespiculaareabouteight

aswideasthecorrespondingportionofthebody.

Twoaccessoriespiecesadjoin-

ningthedistalfourthsthespicula;extendingbackwardatrightangles
tothespiculaarethecanthypophyessthree-fifthsaslongastheanaldiameter.

The

numberandstructureofthetestisareuncertain,butapparentlythere

aretwo,ofwhichtheanteriorisreflectedandtheposteriorisstretched.

The

sexualcellsofisunusuallylargeandtheirowallsappear
todivideupthetestestoinanirregulargeometricfashion.

Habitat:

Marine
mudandsand,

Nonmea,

NewCaledonia.

Fig.53b.
ORDER POLYLAIMIA

V. ORDER POLYLAIMIA

Inconspicuous, occupying the anterior two-thirds of the tail, thus: 101; 111; 1. The members of the posterior four pairs are not located exactly opposite each other, but tilted slightly to one side. The body is a little less than half the length of the tail. The spiculae are close together, about one-eighth as wide as the corresponding portion of the body, and end in minute 'but'-tons. The lateral pores on the tail are the final members of the lateral organ series. Habitat: Intestine of field cricket, Gryllus neglectus Scudder, Fig. 54a and b, 1877.

This order cannot at present be satisfactorily defined as most of the others herein represented. There are probably no more than 20 genera placed in this order. The genera are arranged in the order of their family relationships. In general, the genera first mentioned in an ordinal group, and the genera placed at the end of the group, exhibit more or less manifest relationships to genera included in other orders. See page 217.

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1. 

Ms. Demonstrum spiculatum, n. g. The wing begins near the head and ends near the tip of the tail. The body is of medium length, about one-eighth the length of the tail. The body is a little less than half the length of the tail. The spiculae are close together, about one-eighth as wide as the corresponding portion of the body, and end in minute 'but'-tons. The lateral pores on the tail are the final members of the lateral organ series. Habitat: Intestine of Panesthia brevifolia Sauss., the common spiny-legged wild cockroach; Moss Vale, New South Wales, Australia, 1889, Osmic acid. 152. 3. 5. 25, 1. 56

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2. 

Ms. Demonstrum spiculatum, n. g. The mouth opening is covered by three or six very minute, slightly refractive structures. About opposite the bases of the cephalic setae there are exceedingly minute ommatidia (?), possibly six, difficult to see in profile, impossible to count, because of their proximity to each other. The mouth opening is covered by large chitinous setae, one or three in number, occupying the anterior two-thirds of the tail. The members of the posterior four pairs are not located exactly opposite each other, but tilted slightly to one side. The body is a little less than half the length of the tail. The spiculae are close together, about one-eighth as wide as the corresponding portion of the body, and end in minute 'but'-tons. The lateral pores on the tail are the final members of the lateral organ series. Habitat: Intestine of field cricket, Gryllus neglectus Scudder, Fig. 54a and b, 1877.
ORDER POLYCHETOMA

Zalonia, pseudonchus, small size and theiroverlapping amphids forward-pointing, minute, difficult to see.

The oesophagus becomes slightly narrower where it passes through the buccal opening...

The thick-walled intestine becomes at once about two-thirds as wide as the body, and its cross-section is made up of about four cells, which are packed with granules of uniform size.

The lateral fields are about one-third as wide as the body, and contain a series of cells of large orgi size.

The nerve-rings surround the oesophagus obliquely.

There is a single, small, elongated ventral supplementary organ of the ordinary kind opposite the posterior part of the spicula, and in front of a number of supplements occur on the tail.

The ejaculatory duct is about two-thirds as wide as the body.

The caudal glands are evidently located in front of the tail, but their exact position has not been made out.

Habitat: Marine sand and mud, Noumea, New Caledonia. Sublimated in 1866.

Zalonia, pseudonchus, small size and theiroverlapping amphids forward-pointing, minute, difficult to see.

The oesophagus becomes slightly narrower where it passes through the buccal opening...

The thick-walled intestine becomes at once about two-thirds as wide as the body, and its cross-section is made up of about four cells, which are packed with granules of uniform size.

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The ejaculatory duct is about two-thirds as wide as the body.

The caudal glands are evidently located in front of the tail, but their exact position has not been made out.

Habitat: Marine sand and mud, Noumea, New Caledonia. Sublimated in 1866.
ORDER POLYLAEMIA

**Myolaimus**, where the conoid spinneret has a diameter about one-fifth as great as that of the base of the tail. From the slightly elevated vulva the vagina leads inward half way across the body, where it joins the two, symmetrically placed uteri. The ovaries reach about half way back to the vulva, at least in specimens in which the uteri are empty. There are eight to ten ova in each ovary, arranged single file. The spermatozoa of the male is about one-third as wide as the base of the tail. No supplements or special setae or papillae have been observed either in front of the anus or behind it. The spicula are rather uniform and taper to an acute point in their distal thirds; in profile their proximal ends are seen to lie near the ventral surface of the body. The ejaculatory duct is about half as wide as the body.

**Habitat:** Mud, tide pool, Portsmouth, N.H., U.S.A. Sublimated to balsam.

Fig. 58, p. 273.

59. *Polylaimus exilis* sp. n. 13 Striae of the thin cuticle minute. It seems very likely that four cephalic setae have been lost from the specimen from which the description and illustration are drawn. Lips three, and double, (or possibly six), with six minute labial papillae. Cuticle naked. Neck convex-conoid, especially toward the head. The oesophagus at the nervering is one-half, just in front of the cardia swelling one-half, and finally two-thirds, as wide as the corresponding portion of the neck. The elongated pyriform cardiac bulb is very small. The lining of the oesophagus is quite distinct and at first is indicated by two refractive lines, occupying a space one-sixth as wide as that of the oesophagus. There appear to be no glands in its fine colorless musculature. There is an indistinct cardia. The thick-walled intestine is set off by a collar one-third as wide as the base of the neck; it has a faint lumen and becomes at once two-thirds as wide as the body. In cross-section it is made up of two to three cells. Anus more or less continuous; rectum somewhat constricted, equal in length to the anal body-diameter. The granules contained in the intestinal cells are numerous, uniform and colorless. The tail is conoid from the anus, and then cylindrical in the posterior half, where it is two-thirds as wide as at the base. It is probable that the caudal glands are small and located near the anus. There are no caudal setae. Benette present; excretory pore probably located near the nerve-ring. Full-grown ova are twice as long as the body is wide, and nearly one-half as wide as long. The reflexed parts of the ovaries reach about three to four body-widths back toward the vulva.

**Habitat:** Sand below low-tide mark, Belmar, New Jersey, U.S.A. Sublimated to balsam. Apparently the species is syngonic. Up to the present time extremely few free-living specimens have been observed to be syngonic. A similar species with four setae occurs at Woods Hole, Mass., U.S.A. Fig. 59.

60 *Myolaimus heterurus* sp. n. 14 Cuticle thin, naked; striae fine. Lips thin, low, flat, confluent; six, or three and two-parted. Amphids faint, in the form of transverse slits. That portion of the pharynx in front of the amphids is about half as wide as the lip region; this chamber is continued by a narrower tubular portion, nearly conchoidal as long as the neck and surrounded by a peculiar radial musculature, differing from that of the oesophagus proper. Nearly as far behind the amphids as these latter are behind the anterior extremity, there is a prominent infolding in the wall of the pharynx. The amphids are difficult to detect with the means in profile;—more easily when viewed dorso-ventrally. Behind the anterior chamber of the pharynx, which in many respects resembles that of Diplonema, there is a muscular portion closely resembling the oesophagus in size and structure, but which seems undoubtedly pharyngeal. This is indicated in two ways; first, the lining is different from that of the portion of the oesophagus immediately following it, and second, it behaves differently with staining material, indicating that its muscular wall also is considerably different in nature from that of the oesophagus. The dimensions given in the formula relate to the anterior or labial chamber. At the base of the anterior pharyngeal chamber there appear to be minute cutaneous processes which perhaps may function as onchia. It would appear possible that all that portion of the pharynx in front of the folds in its lining are capable of being opened out or everted. From the pharynx the oesophagus is cylindrical to nearly the nerve-ring, where it diminishes rather suddenly in diameter near the very faint vestiges (?) of a median structure. The vestiges consist in internal modifications of the oesophagus only. From the nerve-ring onward the oesophageal tube is about two-thirds as wide as the corresponding portion of the neck. It finally expands to form the elongated-ellipsoidal cardiac bulb, which bears a more or less distinct cardia, and is separated from the intestine by a shallow constriction. The cardiac valvular apparatus appears to be comparatively simple. The intestine becomes at once four-fifths as wide as the body. The intestinal walls are rather thick, and the cells are packed with minute granules. The rectum is about twice as long as the anal body diameter. The lateral fields appear to be half as wide as the body. The tail of the female is conical to the acute terminus and presents the peculiarity of diminishing in diameter very suddenly immediately behind the anus, the diminution taking place on the ventral side. The anal region is, therefore, cephalic on this account, as well as on account of the fact that it is slightly depressed, and again on account of the refractive nature of the lining of the comparatively long and large rectum. The salient lips of the vulva are conspicuous, a property that is increased by the refractive nature of the lining of the vagina, which extends inward two-fifths the distance across the body. Tail of the male very different from that of the female. There is a bursal membrane connected with the digestive organs shown in Fig. 60. The specimen seen were notling, so that the exact nature of the membrane, which is believed to connect these organs one with another, has not been deciphered. It seems also certain, however, that the anterior four are joined together by means of a ventrally submedian membrane somewhat as in the case of the genus in Rhadinidae. The spicula are very weak and poorly developed in the specimen thus far seen. They appear to be as long as the tail, and are probably embedded at their proximal ends by contraction; but they are very difficult to discern, and it is possible that the appearances are deceptive and that they are altogether absent. The testes extend forward to near the posterior end of the neck and appears to be reflected for a short distance, but this is somewhat uncertain.

Fig. 59: Longmy el, El Paso, Texas, U.S.A. Flemming to glycerine jelly. Fig. 60.
61. Mycotauchenius pollurudum n. sp. 

There are traces of a very fine transverse striation. No amphids or setae of any sort to be seen. Head continuous. Six relatively large, obtusely conical lips, each long pharynx divided into two very distinct parts of about equal length, together occupying nearly two-thirds the length of the neck. The anterior part is a simple, narrow, straight cutinised tube, having a lumen one-third as wide as the lip-region. The succeeding second part of the pharynx is a cylindroid bulb, rounded at both ends, and two-thirds as wide as the corresponding part of the neck. Its lumen is triangular and of about the same width as that of the anterior part of the pharynx, from which it is separated by a distinct break in the continuity of the cutinised lining. From this elongated bulb a tube one-sixth as wide as the corresponding part of the neck passes backward and gradually expands into a valveless bulb half as wide as the base of the neck, thus completing the oesophagus. The intestine, which at first is colorless and transparent and only one-fourth as wide as the body, gradually expands and becomes half as wide as the body and distinctly granular. The refractive lining of the intestine is a prominent feature. The cardia is unusually long and narrow, and opens into a small cardiac cavity. The cells composing the intestine are relatively large. The length of the well-cutinised reteculum is about one and one-half times that of the anl body diameter. The large, granular, ellipsoidal renette cell, two-thirds as long as the body is wide, and two-thirds as wide as long, lies a short distance behind the base of the neck, and empties through an ellipsoidal, thin-walled ampulla. The nerve-ring is accompanied by nerve cells. The yellowish spiculae are slender and subacute. Their proximal ends appear to lie somewhat dorsoventral to the body-axis. There are two separate, strong, rather stout, simple accessory pieces. They are one-half to two-thirds as large as the anal body diameter, and their proximal ends lie near the dorsal body wall. There are no supplementary organs, setae, or papillae on the tail. The ejaculatory duct is one-third, the vas deferens one-third, and the testes one-half, as wide as the body. The testis tapers and is at last narrow.

Habitat: Marine; Mollendo and Salaverry, coast of Peru, S. A. Sublimatized in balsam. Fig. 62.

63. Ironella prismatalela sens. sp. 

Lateral wings very faint. Body naked. Lips six, very tenuous, revolute, forming a short tube one-fourth as wide as the lip-region. There are six obscure, flat, conical, labial papillae, not shown in the illustration. Labial setae minute "forked" at the extremity. Each of the three oosteg is duplex, the two parts of the submedian ones being of unequal size. The oosteg are contained in a somewhat oval cavity. Odontia subacute, with an outward stroke; when at rest somewhat outward-pointing, and blocking the entrance to the pharynx. Posterior part of the capsule, which apparently lined with exceedingly minute denticles. Neck cylindroid, ampullo, apparently consisting of an almost imperceptible transverse groove, partially encircling the head. The cylindroid oesophagus is at the narrow ring-four-sixths, and finally three-fifths, as wide as the corresponding portion of the neck; its lining is prominent, occupying one-third the diameter of the organ. In the course, colorless musculature there are
three glands which empty at the mouth. There is a cylindrical cardia two-thirds as wide as the base of the neck. The thick-walled intestine is set off by the large pyloric glands. Very fine, colorless, motile or polyhedral granules of variable size are found scattered in the intestinal cells. The largest of these are one-twenty-fifth as wide as the body. They give rise to no cellular formation. There are no caudal extremitjes. The ovaries are one-fourth as wide as the body, and faintly granular. The very frail, straight, slender, subacute spicula become arcuate near the tips, and are faintly cephalated by expansion. Their proximal extremities appear to be united and are directed dorso-ventrally. The very frail, straight, slender, subacute spicula become arcuate near the tips, and are faintly cephalated by expansion. Their proximal extremities appear to be united and are directed dorso-ventrally.

**Habitat:** Sand, Nobsca Beach, Woods Hole, below low tide. Fig. 63.

**Order Synodontia**

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**Chambersiella**

- The males are less common than the females.

**Habitat:** Bark of a great variety of trees in many parts of the eastern United States, on "Spanish Moss," Miami, Florida. Fleming's solution to glycerine jelly. This genus comprises a considerable number of species, all with a hooked caudal extremity.

The species vary considerably in the labial accessories. The present species has the strongest mandibles so far known in the genus. These nemas are highly resistant to drought and cold, and may be kept on dried bark for several years and then be fully revived by soaking the bark in water. They may be repeatedly frozen in and thawed out without injury. Recently revived specimens are mostly immature and seem to present an empty intestinal canal, suggesting that on the approach of unfavorable conditions, they evacuate the canal. Not infrequently, the lip-region of either species appears to exhibit a plug-like accession, seen also in the mouth opening of similarly revived Cephalobus. The opening is protected during "suspended animation" by means of this dried-up evagination from the oesophagus. Fig. 64a, p. 278; Fig. 64b.

The name of this remarkable genus, the abundant species of which are widely distributed on trees, commemorates the classic work in this field of Mr. W. E. Chambers, through whose untimely death science has lost one of its greatest graphic interpreters.
66. *Synodontium* fecundum n. sp. About forty setae occur on the neck; those on the anterior part are about one-half, while those on the posterior part are one-fourth, as long as the corresponding portion of the neck is wide. There are six sub-distinct lips, each with a somewhat forward-pointing, innervated, conoid papilla. The pharynx is finely out-lined, and bears probably twelve closely approximated odontia, forming a distinct circle opposite the bases of the cephalic setae; only their points are easily visible. The conoid neck becomes more decidedly conoid near the head. At first sight the oesophagus appears as if composed mainly of glands, which extend backward to the cardia. These glands are, however, outside the oesophagus and empty near the bases of the odontia by means of three or four ducts. At the nerve-ring the oesophagus is three-sevenths, and finally one-half, as wide as the corresponding part of the neck, and ends posteriorly in a faint, elongated, pyriform, valveless bulb. The lining of the oesophagus is narrow; its musculature fine. The thin-walled intestine has a faint lumen and is set off by a column two-fifths as wide as the base of the neck and becomes at once one-half as wide as the body. In cross-section it presents four to five cells. The scattered granules are of variable size, the largest being one-fifteenth as wide as the body. The nuclei of the intestinal cells are one-seventh to one-eighth as wide as the body at the base of the neck. Tail conoid from the anus, but tapering faster near the anus. The end of the spinneret is in the form of a hemispherical button, the three sectors of which are ever-reversible, so that the organ may appear three-lobed. The ducts of the caudal glands are separated by refractive lines. Toward the head end the annules diminish in width until they elude detection. Neck conoid; head rounded. Here and there on the neck occur long, slender hairs, as long as those on the head, but colorless and very much more slender. Each of the six lips is strengthened by three, dark-brown, or blackish, strongly arched, incurved, slender, acute, ciliated ribs or teeth. Lips capable of being turned over into the pharynx so as to form a flattish, centrally indented dome. From the head backward the oesophagus narrows a little, becoming two-thirds as wide as the corresponding portion of the neck. There is no very distinct cardia. The rather thick-walled intestine becomes at once about half as wide as the body, and in cross-section presents about four cells. The cells contain scattered brownish granules, of variable size, the largest of which are nearly as wide as one of the annules of the cuticle. The lumen of the intestine is quite narrow, and its lining somewhat refractive. Renette unknown. The tail of the male is conoid from the anus to the somewhat blunt terminus, which has a plain, rather blunt spinuncor, armed with two setae considerably longer than the diameter of the terminus. The caudal glands appear to be located in front of the anus. The brownish spicula have been seen only in dorso-ventral view. The accessory pieces are curved distally in the same way as the spicula, and end in minute points. The ejaculatory duct is about one-third, the vas deferens about one-half, as wide as the body.

**Habitat:** Larat, East Indies; marine.

In the general form of the neck and pharynx these nematodes closely resemble *Munhystera*, but the food habits are as long as the spicula. Their uniform, blunt apophyses extend backward at an angle of ninety degrees with the spicula, and are one-half as long as the anal body diameter. Fifty to seventy equidistant supplementary organs, in the form of a series of slight undulations, extend forward in front of the anus a distance three to four times as great as the length of the tail. The undulations are separated from each other by a space equal to one-fourth the body diameter; though they become gradually a little farther apart anteriorly. Their elevation is slight, and every other undulation is opposite a granular, sacate gland, about one-third as wide as the body. These glands form a continuous series and seem to empty ventrally. There is no bursa. The ejaculatory duct is one-third, and the testes are one-half, as wide as the body, these latter gradually tapering so that they are narrow at the extremities.
282 ORDER SYNODONTIA

probably different, and the structure of the male differs materially from the structure of the male of Monhystera—dark-colored, punctate, out-bending spicula; and two testes. A very similar marine species occurs in the harbor at Portsmouth, N. H., and at Woods Hole, Mass., U.S.A., namely Deptonema fimbriatum, n. sp. of which the formula and the figure of the head end are given on this page. The head of Deptonema fimbriatum differs but slightly from that of D. fimbriatum. Deptonema is manifestly an offshoot of Monhystera. Probably the eighteen refractive labial elements are attached to a thin membrane. They sometimes appear, however, as if free at the extremities, and if so, would function as combs in securing the food, which is probably combed or scraped from the surface of algae and other submarine objects. Fig. 66a, p. 281 (fimbriatum); Fig. 66b (fissicarnis).

The longer, cephalic setae are two-jointed. The scattered, inconspicuous cervical setae are one-tenth as long as the neck is wide. Opposite the pharynx the head contains dark brownish gray pigment. The consistency of the labial palp remains undetermined, that is to say, it is uncertain whether they are spadulate with an inward stroke and capable of exerting a firm grip, or whether they are more or less flabby palp. Nock somewhat cylindrical, expanding a little toward the head. Amphids with a pore near the posterior margin, from which there leads inward and backward a narrow duct with granular contents. There is a faint, elongated, more or less pyriform cardiac swelling. Near the nerve-ring the oesophagus is one-half to three-quarters as wide as the corresponding portion of the neck. The musculature of the oesophagus is rather coarse and colorless. Cardiac column two-thirds as wide as the body. The intestine begins with a specially modified segment, two-thirds as long as the corresponding body diameter. The intestine, which has a somewhat irregular lumen, gradually becomes one-half to two-thirds as wide as the body. The colorless granules in the intestinal cells are scattered in groups and are of variable size, the largest granules being about as wide as one of the annules on the neck. The siphons is strongly characterized by the presence of more or less angular, doubly refractive crystalline masses, having about the same diameter in every direction, and being about one-sixth as wide as the body. The crystalline bodies are one-half to one body-width apart and seem to lie in the longitudinal fields. The coiled tail tapers from the anus, but at last for a short distance is more or less cylindroid and one-fifth as wide as at the anus. There are no caudal setae. The diplopodial to prorate multinucle cell lies close behind the neck, and is one-half as long as the body is wide and five-sixths as wide as long. The long, continuous vulva is inconspicuous. The medium-sized vagina extends two-fifths the way across the body. There is a posterior rudimentary branch to the sexual organs, three times as long as the corresponding body diameter. The uterus is four times as long as the body is wide, and one-sixth to one-fifth as wide as long. The elongated eggs are three times as long as the body is wide. The relatively very small ovary contains twelve ova, which diminish rapidly in size toward the blind end, and are arranged single file. The finely-granular, ripe ova are three times as long as the body is wide, and three-fourths as wide as long.

Habitat: Sand, below Bathing Bench, Woods Hole, Mass., U.S.A. Fleming to water. The males of this species, C. fuscacephalum, are unknown, but the males of two other species are known to the writer. As these two are structurally closely related to C. fuscacephalum, it may be assumed that the spiralia of C. fuscacephalum are similar to those of these others, one of which is C. fuscacephalum n. sp., Miami, Fla., the anal region of the male of which is shown in the adjacent illustration, together with the dimensions of both sexes. Besides being smaller, C. fuscacephalum differs in lacking pigment at the head end; in having relatively slightly longer and more nearly equal cephalic setae; in having amphids relatively larger, three-sevenths as wide as the head; in having the posterior oesophageal swelling almost indistinguishable; and having the preliminary segment of the intestine as long as the body is wide, and the intestine itself relatively a little wider—three-fourths as wide as the body. Fig. 67a, p. 282, C. fuscacephalum; Fig. 67b, C. fuscacephalum n. sp., type species.

Cylindroid setae on each lip. There appear to be six lips, but this number is assumed largely on the basis of the six labial appendages, shown in the illustration. The lips are relatively rather thin, and are arched together over the somewhat spheroidal pharynx. Oesophageal cylindroid.

The posterior lip of the anus is slightly raised; rectum about as long as the anal body diameter. The tail tapers from a little in front of the anus and soon is reduced to a diameter about half as great as at the base. Thence onward it tapers gently, so that near the terminus it has a diameter about.
one-fourth as great as at the anus.

Posterior two-fifths of the tail armed with short, backward-pointing, acutate, aculeate, thorn-like setae to the number of ten on each ventrally submedian line. No calid glands. The lateral fields appear to be fully one-third as wide as the body. The excretory pore appears to be connected with a large, ellipsoidal ampulla, nearly half as wide as the neck. The position of the renette cell has not been determined. From the depressed vulva the vagina leads slightly forward. Beyond this fact little is known concerning the internal organs. As no traces of ov are been seen behind the vulva it is assumed that the organs are asymmetrical.

Habitat: Mud, tide pool, low tide, Portsmouth, N. B., U. S. A. The single specimen examined contained numerous yellowish, spherical, crystalline bodies, arranged in an obscurely double series, beginning at the base of the neck and ending at the anus. Whether these are natural or have been induced by the method of preservation remains to be determined. The peculiarities of the species justifying the establishment of a new genus are as follows: (1) the formation of the pharynx; and of the lips with their distinct forward-pointing appendages; of the pharynx and of the lips; (2) the absence of calid glands; (3) the absence of cephalic setae.

The tapering ovary is at first broad, and contains numerous ova arranged for the most part single file. At its blind end, it is one-eighth as wide as the base of the neck. At their widest part, that is, near the middle, the ova are one-sixth as wide as the corresponding portion of the body. They taper to a rather blunt point, and present a faint, whitish sheen. The colorless, rather frail ova appear to have their proximal ends somewhat dorset from the body-axis. There is a faint, frail, slender, arculate accessory piece, lying parallel to the ova, probably consisting of a differentiation of the lining of the cloaca. Occas papillae occur on the middle part of the tail, near the place where it suddenly diminishes a little in diameter. These are probably as follows: one ventrally submedian pair opposite the middle of the ova; three ventrally submedian pairs, one of them nearly anal, the other two at the beginning of the middle third, and occurring one in front of the other; one dorsally submedian pair. The large spermatoocytes in the testes are three-fourths to two-thirds as wide as the body. That portion of the testis, containing them, is correspondingly wide, but the testes taper as finally to be only about one-fourth as wide as the body. Habitat: Gill-chambers of the Land Crab G. rufcola, Janadac Coll., Dr. C. B. Wilson, Westfield, Mass. Described from more or less shrunken, alcoholicspecimens, mounted in alcohol and glycerine jelly. May be looked upon as a transitional form between a free-living and parasitic state. Hence, the specific name transitans. While much reduced and flabby, the cephalic setae still exist. Very few parasitic nemas possess cephalic setae. Fig. 68.

b. Monhystrium transitans n. sp. Type species. Cutoff naked, except for the setae on the head. Lips three, more or less confluent, thick and mobile. Pharynx double; the closed lips forming a narrow vestibule reaching one-third the way to the base of the pharynx. Anterior chamber of the pharynx pyramidal, the posterior more of less narrowing. The lips come to a sharp edge, and are stiffened by several refractive "plates," whose direction is radial but indefinite, and by several refractive "plates," whose direction is radial but indefinite, and who have a distinct anterior one-fourth as wide as the base of the neck. Its lining forms expression in three longitudinal lines, occupying a space equal to two-sevenths of the width of the whole organ. Its musculature is rather coarse. There is no cardia. The thick-walled intestine, which is a much reduced and refractive hum, is set off from the oesophagus by a constriction one-fourth as wide as the base of the neck. The posterior part of the oesophagus is divided into three regions, one-third as wide as the body. The latter contain numerous granules of rather uniform size. The walls of the intestinal cells are refractive. The tail is at first conoid, then cylindrical, a double line. Eight to twelve longitudinal expansions occur on each submedian field. The longitudinal strires do not anastomose, and seem to be in the outer cuticle. Lips confluent, elastic, closing to a small central pore. Pharynx of two chambers; the anterior, pyramidal, the posterior appearing roughly ovoid in profile, but really three-sided as shown in the illustration. The distinct, refractive lining becomes rapidly thicker in the posterior half of the second chamber. About eighteen direct radial refractive ribs of small size occur in the anterior chamber, somewhat as in Cystobalanus; i.e., there are about six refractive radial markings on each of the three lips. These have a rather definite duplex outer end, or contour, but are not so definite as the "radii" of Cystobalanus, being more like folds. Neck conoid; head cono-conoid. The cylindrical oesophagus near the nerve-ring is two-fifths, just in front of the pyriform cardia swelling two-thirds,
finally two-thirds, as wide as the corresponding part of the neck. There are no oesophageal bulbs, but there is a pyriform anterior segment of the intestine, set off on both sides by a distinct constriction, in some ways resembling a cardiac bulb. This pseudo-bulb is three-fourths as wide as the corresponding portion of the body, as measured in alcoholic specimens. The lining of the oesophagus is a prominent feature, and its optical expression persists in three refractive lines, occupying a space one-fourth as wide as the entire organ. The oesophageal musculature is coarse. At the cardiac constriction there are three elements, questionably glands, each one-third as wide as the corresponding portion of the body. There is no cæca. The thick-walled intestine has a very distinct refractive lumen and soon becomes five-sixths as wide as the body. The cells composing the intestine are about twice as long as the body is wide, and are so arranged that each cross-section presents practically only two of them. These cells are packed with exceedingly fine granules of more or less uniform size. The tail is first conoid, then cylindrical in the posterior half. It tapers from in front of the anus; the terminus has a contour more or less resembling that of a swan's head. The simple, unamed, symmetrical, blunt spinneret is half as wide as the terminus. The three, broadly ascente caudal glands form a close tandem in the anterior fourth of the tail. Their ducts and ampullae are distinct. There are no caudal setae. The tail, like the body, is naked. The elongate rectocele cell lies two to four body-widths behind the neck, and empties through a wide duct separated from the ampulla by a constriction; the ampulla is one-fourth as wide as the corresponding portion of the neck, and empties through a pore located half-way back to the nerve-ring. The nerve-ring is accompanied by distinct nerve cells arranged in groups. From the somewhat large, more or less conspicuous vulva, the large, rather muscular, cutinized vagina leads half-way across the body. The straight uterus is about fourteen times as long as the body is wide, and contains ovoidal eggs, each about as long as the body is wide, which are deposited after segmentation begins,—in fact, the species may be viviparous. Fully-formed embryos occur in the eggs near the vulva. Spornatogenesis, half as wide as the body of the female, and with strong refractive nodule, occur in the uterus. There is a rather narrow, ventral posterior rudimentary part to the female sexual organ, about one and one-half times as long as the corresponding portion of the body is wide. The ovary is nearly cylindrical, but tapers slightly, and contains numerous ovum arranged single file. Toward its blind end, it suddenly narrows, and is reflected or thrown into a "S" form, in a space one to two times as long as the body is wide; here it is only one-sixth as wide as the body. The rather frail, somewhat simple, rather slender, substernal spicule are one and one-half times as long as the anal body diameter. At its widest part near the middle, they are about one-sixth as wide as the corresponding portion of the body. Their proximal ends appear to lie dorsal from the body-axis. The single, frail, very slender, more or less arcuate, accessory piece is somewhat removed from the spicula, at least from the refractive part. Its proximal extremity lies dorsal from the body-axis. There are no supplementary organs. About ten pairs of papillae occur on the tail of the male. These are very inconspicuous and are arranged as follows: one ventral, single, and two submedian pairs just in front of the anus; third, fourth, fifth and sixth pairs behind the anus, oppose the two anterior caudal glands; seventh and eighth, lateral, opposite the posterior caudal gland; ninth and tenth farther back, not so close together, averaging about twice as far from the anus, as the seventh and eighth. There is a rudimentary bursa; i.e., there are submedian longitudinal elevations of considerable magnitude beginning some distance in front of the anus and extending on to the tail to a point opposite the posterior caudal gland. Most of the papillae described occur on the ventral surface of these welt-like elevations. A cross-section taken near the anus clearly discloses these well-developed organs. The ejaculatory ducts are one-fourth, the vas deferens one-fourth, the testis two-thirds, as wide as the corresponding portion of the body. Toward its blind end, however, the testis tapers so as to be only one-eighth as wide as the corresponding portion of the body. Spermatogenesis, occupying a considerable portion of the length of the testis, are one-half to two-thirds as wide as the body, so that the testis bears considerable resemblance to an ovari. The peculiar appearance created by these large spermatocytes might easily lead to the conclusion that the males are hermaphrodites. Habitat: Found with the preceding. One is inclined to suggest that this Monhysterium also represents a transitional form, from a free-living to a parasitic condition. A careful study of such forms is destined to throw much light on the relationship between the Laimia and Alaimia. Although bearing considerable resemblance to Monhysteria, this species and its close relative just described seem to make a new genus desirable for their reception. The distinguishing differences may be listed as follows: (1) In Monhysteria, the pharynx is a double chamber; moreover, the anterior chamber has a distinctly radiated structure, more easily seen if the specimen is viewed slightly obliquely instead of laterally, as shown in the illustration. These radial elements are stiffening factors enabling the lips to bite more efficiently. The margin of the lips are sharp-cutting edges, as is clearly shown in the profile (4). There is a pronounced reticule. (5) There are no cephalic setae or the setae are very weakly developed. (6) The species is presumably carnivorous; the more typical Monhysteria, perhaps all, are vegetarian. Larvae removed from the uterus of alcoholic specimens present differences from the adults as follows: (1) The ampullas are farther back. (2) The pharynx is tubular, and not in two parts. (3) The head is more tapering. (4) The spinous process is not so well defined. (5) No wings were seen. (6) The pseudo-bulb is less conspicuous. Fig. 66, on this page. Syn. Monhysteria wilsoni Baylis.
where it bends inward and forms an elbowed lip, giving to the front of the head an asymmetrical appearance; hence, the generic name. Neck cylindroid posteriorly, convex-conoid anteriorly. Amphids faint. At the base of the pharynx there are three spherical collections of black, loosely-placed granules (ceolids), one collection dorsal and two submedian, the dorsal collection being the least pronounced. The cylindroid oesophagus at the nerve-ring is one-third, and finally one-half, as wide as the corresponding portion of the neck; it has an indistinct lining, and a fine, colorless musculature. There is a more or less homospherical cardia, three-fifths as wide as the base of the neck. The thick-walled intestine, which is set off by a constitution one-half as wide as the base of the neck, becomes at once three-fourths as wide as the body. It has a faint lumen, and its cross-section exhibits about four cells. In all parts of the intestine the cell walls are rather distinct and optically give rise to a network effect. From the more or less continuous anus the prominent, cutinized rectum extends inward a distance three-fourths as great as the anal body diameter. The rather numerous, more or less yellowish granules contained in the cells of the intestine are of variable size, the largest being about one-thirty-fifth as wide as the body. They are so arranged as to give rise to a more or less distinct tessellation. The lateral fields are one-fourth as wide as the body. The tail tapers from the anus, and is at first conoid, and then convex-conoid in the posterior eighth. It is arrectus to the unarrected, more or less symmetrical terminal. There is a conoid, symmetrical spinneret. In it a compound ampulla is apparent. REMOTE unknown. The female sexual organs are probably double and symmetrically placed.

Habitat: Marine tap water, laboratory, Woods Hole, Mass., U. S. A. Flemming to glycine jelly. Fig. 70.

VIII. Order Synonchida

71. Tripylium carninicola (Baylis). Cuticle naked. Cephalic setae papillate. Wall of the pharynx finely thick and refractive, and curved inward. The inner surface of each pair of lips so as to form three 120° biting organs, which close together as shown in the illustration. Pharynx cylindroid. Neck cylindroid posteriorly, conoid anteriorly. Oesophagus cylindroid, its lining a tripe stronger behind the pharynx for a distance equal to the length of the pharynx. The anterior portion of the intestine is altered so as to produce the effect of a pyriform bulb three-fourths as wide as the base of the neck, set off on both sides by a constitution. At the nerve-ring, the oesophagus is two-thirds, and finally three-fourths, as wide as the corresponding part of the neck. The lining of the oesophagus finds optical expression in three refractive lines, occupying two-thirds of the width of the organ. There is no cardia. What appears to be glandular cells occur opposite the cardinal constriction, — two, one on each side, each elliptoidal and half as wide as the neck, finely granular and with a prominent nucleus. The thick-walled intestine has a distinct, refractive, more or less zig-zag lumen, and becomes at once three-fourths as wide as the body; in cross-section it presents two cells. The cardiac column is one-fourth as wide as the neck. From the more or less continuous anus, the cutinized rectum extends a distance equal to the length of the anal body diameter. Fine uniform granules pack the cells of the intestine; there is a faint tessellated effect due to the refractive nature of the cell walls. From in front of the anus, the straight tail is first conoid, then cylindrical in the posterior two-fifths, where it is one-eighth as wide as at the base. Terminus apiculate, bearing a simple, symmetrical spinneret. The three broadly-ovate caudal glands are packed into the anterior two-fifths of the tail, and empty by means of separate ducts. Three pairs of conoid, subcutaneous, ventrally submedian papilliform setae occur on the tail of the female, one pair near the anus, one near the middle of the tail and one at the beginning of the posterior fourth. Midway on the tail there is a dorsally submedian pair of setae. The finely-granular lateral fields are half as wide as the body. There appears to be an elongated rosette cell one body-diameter behind the neck; it is one-fifth as wide as the body. From the large, conspicuous, elevated vulva, the vagina, also large, extends inward half way across the body. Its wall is cutinized. There is no posterior vestigial portion to the sexual organ. The straight uterus contains twelve or more already liberated embryos. Ova are arranged in single file. The simple, rather frail, slender, uniform, acute spine is arrectus distally. They are three-fourths as long as the tail, and at their widest, about one-tenth as wide as the corresponding portion of the body. Their proximal ends seem to lie more or less dorsal from the body-axis. The simple, frail, very slender, acute accessory piece is more or less obscure in alcoholic specimens. It lies parallel to the spine and its proximal end appears to be dorsal from the body-axis. There are three pairs of very flat, conoid, innervated, inapparent, nearly vertical papillae on the tail, one at the beginning of the fourth fifth, and two at equal distances between it and the anus. The ejaculatory duct is one-third, the testis two-thirds, as wide as the body. Only the narrow blind end of the testis, for a distance equal to one body-diameter, is reflected. In one specimen, the spicula were more or less compound.

Habitat: Found in the gills of the Land Crabs, Securitis ruricola and Cardisoma guanum, Jamaica. Collected by Dr. Chas. B. Wilson, Westfield, Mass. This genus differs from Monhysterina as follows: (1) Male has caudal papillae; (2) Has a cardine bulb or pseudo-bulb; (3) Is viviparous; (4) Is parasite in crabs; (5) Has three biting edges to the segments of the pharynx. Fig. 71. Syn. Monhysterina carninicola Baylis.

72. Xyala striata n. sp. Cuticle with numerous wings, especially anteriorly, where there are sixteen, increasing to about thirty-two on the head; behind the vulva the number is twelve, at the terminus four. Contour dentate. There are a few cervical setae, about as long as the body is wide, occurring in groups of three or four; no somatic setae. Lips thick, armed with three, mandible-like odontia, or oocha, somewhat flat-shaped, and apparently very mobile. Pharynx simple, regular, more or less conoid, large and long, three-fourths as wide as the head, having the form of a deep cup. There is a distinct, transverse, cutinized raised
SYNONCHIUM, GAMMANEMA

290 ORDER SYNONCHIA

circle on the inner wall of the pharynx, dividing it into two more or less distinct parts; nevertheless, the inner contour of the pharynx is rather regular on the whole. Neck cylindrical. Oesophagus plain, except that there is a pyriform bulb surrounding the pharynx, tapering gradually into the oesophagus, which is at first two-thirds, at the nerve-ring one-half, and finally two-fifths, as wide as the corresponding portion of the neck. There is a more or less cylindrical cardia one-third as wide as the base of the neck. The third-walled intestine has a distinct lumen, and becomes at once two-thirds as wide as the body. Cardiac colomn one-half as wide as the body. The scattered, rather uniform yellow granules, found in the intestinal cells, are less than half as wide as one of the annules. From the continuous annus the more or less ciliated rectum extends forward a distance hardly as great as the anal body diameter. The conoid tail tapers from the annus, near which, in the anterior third of the tail, the three ellipsoid, caudal glands lie in a close tandem. There are very few, inconspicuous, slender, tapering, acute, dorsally submedian caudal setae. Renette unknown. The nerve ring surrounds the oesophagus obliquely and is accompanied by obscure nerve cells. From the large, conspicuous valva, the large, tubular, muscular, ciliated vagina extends forward a distance equal to the width of the body, where it joins the straight uterus, which is six times as long as the body is wide and contains eggs two and one-half times as long as the body is wide, and one-third as wide as long.—If one may judge the size of the eggs from that of a full-grown evum. There is a spermatocoele extending forward a distance five to six times greater than the body diameter, the extent of which is plainly indicated by the definite contour of its blind end. The rather narrow, tapering ovary contains about twenty oval arranged single file. The spiculae are slender, uniform, and acute. Their spherical proximal ends appear to lie dorsal from the body-axis. The two, separate, slender, acute, strong accessory pieces have proximal parts that appear to envelop the spiculae. There are no pre-anal ventral spiculae. The ejaculatory duct is one-third as wide as the body. The narrow, cylindrical testes finally taper to a width two-fifths as great as that of the body.

Habitat: Eel-grass, Woods Hole, Mass.; also Belmar, New Jersey, U. S. A. Sublime to balsam. Fig. 72.

73. Synonchium obtusum n. sp. There are no wings. On the lateral fields, which are about one-fourth as wide as the body, the secondary elements of the annules become scattered and coarser, and oval or elongated in contour. There are two laterally submedian, irregular rows of pores, one to two times as wide as the annules, lying along the margins of the lateral fields, and separated from each other transversely by a distance about equal to one-fourth the width of the body; measured in a longitudinal direction, the distances between the pores are about the same, but somewhat irregular. These pores have a special arrangement on the tail. (See illustration.) Neck cylindroid; oesophagus somewhat cylindrical, but presenting a more or less spheroidal bulb about the mandibles. At the base of the neck, the oesophagus is two-thirds as wide as the corresponding portion of the body. Its lining is more or less dis- tinguished from the musculature submedian. The rather thick-walled intestine has a faint lumen, and becomes at once five-sixths as wide as the body. Throughout the body under the cuticle, there are coarsely granular, spherical organs one-fourth to one-third as wide as the body, located in the lateral fields, and separated from each other longitudinally by a distance about equal to the body diameter. It is probable that the female organs are double, and symmetrically reflexed.

Habitat: Seaweed, drifted ashore, Ocean Beach, Miami, Florida, U. S. A. Fig. 73.

74. Gammanema ferax n. sp. Neck cylindroid. Cuticle naked, except for the setae on the head. Lips joined by a membrane, variously armed as shown in the illustration. Probably the twelve "spatulate" appendages are sensory organs, if one may judge by their form and position. The pharyngeal bulb contains three "apophyses" each carrying near its summit an inward-pointing, acute onchium,—or perhaps it would be better to say, each of the three strong ribs of
ORDER SYNCHIACEA

The posteriormost portion of the pharynx bears one of these onchiæ. The oesophagus gradually diminishes so that at no great distance behind the head it is but little more than half as wide as the neck, and continues thus throughout. There is a somewhat small, hemispherical cardia about one-third as wide as the base of the neck. The intestine becomes at once about three-fourths as wide as the body. In cross-section it presents two to six cells, manifestly of two different kinds, one of which, a minority, is much more distinctly granular than the other and is more numerous in the anterior portion of the intestine than in the posterior. The limits of each cell, of whichever kind, are rather clearly marked on account of the refractive nature of the cell-walls. The cells are packed with a multitude of fine, nearly colorless granules. The anus is prominently raised; the rectum is as long as the anal body diameter. The tail is conoid to the convex-conoid terminus, which forms a convex-conoid, somewhat truncate spineter of large size, in which is the group of large saccules of the caudal glands, which nearly fills the terminus, its diameter being about half as great as that of the base of the tail. The large caudal glands are located in a close tandem just behind the anus, in the anterior two-thirds of the tail. The lateral fields are fully one-third as wide as the body, and contain cells of unusual size,—of such a width as to reach nearly across the fields themselves. These cells are not contiguous, and there are found with them in the lateral field cells of small size. Renette unknown. From the elevated vulva the vagina leads inward half way across the body, where it joins the single uterus, which extends backward. The ovary reaches about half way back to the vulva and contains six to twelve developing ova, of which the larger are arranged single file. The eggs appear to be elongated, somewhat longer than the body is wide and about one-third as wide as long. The anus of the male is prominently raised. In front of it there is a ventral series of supplements, organs occupying a space equal to six to eight body-diameters. The hindermost of these organs is located opposite the posterior part of the from the last nearly opposite the proximal ends of the spicula; the series continues along the ventral line with a somewhat equidistant arrangement, the total number of supplements being at least sixteen. Each supplement is a somewhat narrow cutinated structure of small size, extending outward and backward, and its distal extremity is capable of being exerted. These organs are not very conspicuous. A few submedian setae are seen near the anus, one pair opposite the distal parts of the spicula, and one or two on the bulky portion of the tail. The slender, uniform spicula have their proximal ends located opposite the body-axis. The width of the spicula is not much greater than that of the surrounding nucleæ,—in other words, the spicula are quite slender. They are accompanied by obscure accessory pieces. The ejaculatory duct is about one-third as wide as the body, the vas deferens about half. The testes are unusually short and broad, only about four to six body-diameters long, and are, at their broadest, two-thirds as wide as the body; they taper rapidly to the blind ends, which are only about one-fourth as wide as the body.

Habitat: Marine; coral sand, New Hebrides. Subiminate to balsam. Fig. 74

293

84. Trogolaimus unijorctis n. sp. Lip-region divided into twelve parts, readily distinguishable, though not cutinated. The broadly cup-shaped anterior portion of the pharynx is that part referred to in the formula. From its rather flattish base three apophyses extend backward close together, near the axis of the head, a distance about equal to the depth of the open portion of the pharynx, thus adding a second chamber. Each of these apophyses has a small, inward-pointing onchiæ at its apex. These setae are about three-fourths as wide as the body. It crosses section probably presents two to four cells. These contain a multitude of minute, evenly distributed granules. The walls of the cells are refractive. The lateral fields are about two-fifths as wide as the body, and appear to be composed of two rows of cells. Renette unknown. The tail of the male is conoid from the prominently raised anus. It diminishes in diameter rather slowly until near the end. The diameter of the base of the spicule is about one-sixth to one-eighth as great as that of the base of the tail. The caudal glands appear to be located in front of the anus. In Cystobolalis, with which Trogolaimus may be compared, it is usually easy to discern the ventral gland and excretory pore. So far these have not been seen in the present species. The following is a description of the tail of a young female: The posterior lip of the anus is distinctly raised and rather broad. The rectum is somewhat longer than the anal body-diameter. The tail is cylindrical to the rounded or conoid-dumbbell-like terminus, which ends in a somewhat cylindrical spineter, having a diameter about one-sixth as great as that of the base of the tail. The length of the tail is about two and one-half times as great as that of the anal body-diameter. This description is derived from a specimen in which the sexual organs are represented by an oval body consisting mainly of two cells. Supplements twenty-one, slightly elevated, flat, similar to those frequently seen on the males of Chromadora. These organs occupy a
distance about three times as great as the length of the tail; the posterior ones are a little nearer together than the anterior ones. The two hindermost are opposite the anterior halves of the spicula, while the antepenultimate is a little in front of the proximal ends of the spicula. The average distance between the organs is one and one-half to two times as great as their diameter. No special setae or papillae have been seen on the tail either in front of the anus or behind it. The strongly developed spicula taper at both ends. The proximal ends are slightly hooked toward the ventral side of the body, and also slightly enlarged, so that they are distinctly ephalated. The main portion of the framework of each spiculum consists of four refractive elements arranged in two pairs,—one dorsal, the other ventral. The slightly curved accessory piece leaves the surface of the spiculum somewhat and then recurves so as to touch them again. The ejaculatory duct is half as wide as the body. Habitat: Mud, tide pool, low tide, Portsmouth, N. H., U. S. A. At first sight this species appears to be a Cystobolaimus but examination shows a number of important differences. The pharynx is not stratified in the same way as that of Cystobolaimus, nor is there a dorsal onchium. The excretory system of the male is very similar to that of Halichoelancum, but differs in that the numerous minute pharyngeal denticles of Halichoelana are lacking. Alternating with each pair of the twelve amalgamated lipsthere are papillae which extend an exceedingly short distance beyond the margin of the lips. Fig. 75, p. 293.

IX. Order Mesonchia.

76. Mesonchium porrectum n. sp. The thickish, colorless cuticle has on the females three rows of round cuticular elements on the lateral fields, on the males, two; similar markings arranged irregularly occur on the ventral surface. Setae, half as long as the corresponding part of the body is wide, are found scattered on the neck. None are seen on the body. Rows of pores occur on the lateral fields, one row on each side just outside the longitudinal rows of lateral markings. The diameter of these pores is about equal to the width of two annules; the distances separating them longitudinally are about equal to the diameter of the pores. Lips confluent, rounded, thick. Each onchium appears to be the apex of a plate which forms one of the three faces of the pharyngeal cavity. These plates are thickened at the anterior end of the pharynx. Pharynx surrounded by longitudinal muscles, which probably serve to force the three teeth forward in a direction parallel to the axis of the head. Neck conoid. Oesophagus conoid, with a faint cardiac swelling, hardly to be called a bulb. Near the nerve-ring, the oesophagus is one-half, and finally three-fourths, as wide as the corresponding portion of the neck. The lining of the oesophagus finds optical expression in three parallel, refractive lines. Its musculature is rather coarse. There is a more or less hemispherical cardia, one-fourth as wide as the base of the neck. The intestine becomes at once three-fourths as wide as the body, its

cells containing numerous granules of rather uniform size, and of about the same diameter as the dot-like lateral, cuticular elements. The conoid tail tapers from in front of the anus and becomes cylindrical in the posterior third, where it is one-fourth as wide as at the base. The elongated central glands, which empty by separate ducts, are packed in the anterior half of the tail. Slightly tapering setae, in number of twelve occur on each ventrally submedian line in front of the anus; about seven setae occur on each of the submedian lines on the tail. The pre-anal setae are scattered through a distance about equal to the length of the tail, and are mostly very inconspicuous, especially anteriorly. The lateral fields are two-sevenths as wide as the body. The non-granular, ellipsoidal operculum overlaps the cardia and is one-third as wide as the base of the neck. The large, rather conspicuous, elevated vulva leads into a large, conoid, muscular, more or less cutinized vagina, which extends inward half way across the body. It is probable that the prolate eggs are about as long as the body is wide, but there is some uncertainty about this. An unusual feature is that the ovaries are reflected only near their blind ends. Each contains about twenty ova, arranged more or less in single file. The tail of the male is cylindrical in the posterior two-fifths, where, as at the widest, it is only one-fourth as wide as at the anus. The rather long, slender, uniform, more or less acnete, colorless spicula are straight to near the middle, but are acerate distally. Their proximal ends appear to lie more or less ventrad from the body-axis. The rather strong, slender accessory piece has an applied part one-fourth to one-third as long as the spicula; its uniform, more or less blunt, rather slender apophysis bends and extends backward parallel to the body-axis. The proximal extremity of the apophysis lies dorsal from the body-axis. To be seen along the posterior half of the region occupied by the oblique copulatory muscles, is a pre-anal series of almost invisible ventral inversions, the distance between which are about equal to one-third the body-diameter. The space occupied by the oblique copulatory muscles is about two and one-half times as long as the tail.

Habitat: Marine algae, Key West, Fla., U. S. A. Flemming to glycine jelly. Fig. 76, p. 294.

77. Pepsonema pellucidum n. sp. Cuticle of medium thickness. Anteriorly the number of the longitudinal rows of "beads" appears fewer than near the tail, where there are sometimes six or possibly eight rows. Formation of the cuticle like that found in the genus Spilophora. Somatic setae very minute. Eyes six, or three and two-parted. Mouth-opening about one-fourth as wide as the front of the head, and leading into a minute vestibule, which is nearly twice as wide as the mouth opening and very shallow. The pointed, cutinized spines of three inner lips come together in this vestibule; they are of nearly equal size, the dorsal being only slightly larger than the two submedian ones. It may possibly be questionable whether this genus should not be placed in the Anochoa. At the base of the pharynx, there are one or two minute, onchium-like processes, which are so small as to be easily overlooked. The oesophagus continues to have the same width, or to decrease slightly, until it
Trissomonchulus

78. *Trissomonchulus oceanus n. sp.* Cuticle naked, practically without marks of any kind. Oesophagus refractive, in contour roughly equilateral, slightly curved, apparently with an outward stroke. When the mouth is slightly open, the apices of the teeth are on a level with the surface of the head. Neck slightly conoid—convex-conoid at the head. Amphids very faint. Inner surface of each of the six lips armed with scores of exceedingly minute, closely set denticles. Oesophagus cylindrical, then conoid in the posterior fourth, where there is a faint cardia swelling, which can hardly be called a bulb. At the nervous ring the oesophagus is one-half, and finally three-fifths, as wide as the corresponding part of the neck. The indistinct lining is expressed by three parallel lines occupying a space two-sevenths as wide as the oesophagus. There is a conoid cardia one-half as wide as the base of the neck. The thin-walled intestine becomes at once three-fourths as wide as the body, at least when gagged. Its cross-section is probably made up of eight to ten cells. These cells contain scattered colorless granules of variable size, the largest of which are one-fortieth as wide as the body. Tail sub-cylindrical in the anterior three-fourths. The spinneret presents the peculiarity of being on the ventral surface of the tail some distance from the tip. (See illustration.) The elongated-ellipsoidal caudal glands, as long as the body is wide; one-third as wide as long, are located in front of the copulatory muscles. They form a loose tandem, and empty through distinct ducts and ampullae, the latter being large and filling the tail. There are no caudal setae. The lateral fields are one-third as wide as the body and contain large, ellipsoidal cells nearly as wide as the fields themselves, occurring at intervals of one to three body-widths; these are apparently glandular, and connect with the surface by means of pores on the lateral line. The excretory pore is at the lips and is directed forward. The rectal cell, one neck-length behind the cardia, and as long as the neck, is granular and contains a large nucleus; its duct is about as wide as the cuticle is thick, and being closely granular, is rather easily followed. There is an anterior rudimentary part to the female sexual organs two to three body-widths long. From the continuous vulva, the medium-sized, more or less tubular vagina leads inward two-thirds the distance across the body. The broad, cylindrical ovary contains about thirty ova, arranged single file proximally, but irregularly distally. Tail of the male smaller and more arborate than that of the female, and more nearly conoid. The proximal ends of the stoutish, tapering, rather blunt spicula appear to lie opposite the body-axis. There is a rather frail, slender accessory piece. There is a low and more or less obscure ventral pre-anal elevation at the anterior portion of the region occupied by the copulatory muscles. This may perhaps take of the nature of a supplementary organ. On each side, in front of the anus, there are
ORDER APONCHIA

three, and behind the anus four, ventrally submedian papillae, the former separated by spaces about one and one-half times as great as the width of the body. Of those on the tail two are in front of the spinneret pore and two behind. Of the two tests the anterior one is much the longer; both are narrow. The ejaculatory duct is one-half as wide as the body, and so defers one-fifth to one-third. The coelomatory muscles occupy a space five times as long as the tail. The espermatozoa are more or less ellipsoidal, and one-fifteenth to one-tenth as wide as the body of the female. In the male, at a distance in front of the anus four to eight times the length of the tail there are seven elevations, long glands converging backward toward the ejaculatory duct. These glands darken in Flemming's solution. In front of these glands, for a distance equal to four to five times the body-diameter, there are about seventeen spherical glands not darkening in Flemming. These also seem to connect with the ejaculatory duct.

Habitat: Seaweed that drifted ashore after a storm at Ocean Beach, Miami, Florida, U. S. A. Also found in beach sand at Ocean Beach. Flemming to glycerine jelly, Fig. 78, p. 297.

79. Aponchium spinrhodontum n. sp. When the lips are closed the three onchia almost completely fill the pharyngeal cavity. Extending backward and slightly outward from the bases of the teeth are refractive markings in the pharynx, indicating folds, — evidence that the cavity containing the teeth can be everted. The pharyngeal cavity seems to merge gradually into the lumen of the oesophagus; it probably extends backward a distance equal to the diameter of the head. Oesochia of very slightly unequal size — the dorsal perhaps smallest, the submedian ones equal. The oesophagus continues to have the same diameter until after it passes through the nerve-ring, when it expands to form the elongated, pyriform, posterior bulb or swelling, three-fourths as wide as the base of the neck. There is a distinct, somewhat cylindroid cardia, about one-third as long as the neck is wide. The thick-walled intestine, which is separated from the oesophagus by a broad and deep evagination, soon becomes three-fourths as wide as the body. Its cross-section would display six to eight cells. The cells of the anterior portion of the intestine for a distance twice as great as the corresponding body-diameter appear to be of a slightly different character than those farther back, as they almost invariably stain somewhat differently. The preliminary cells of the intestine, namely, a transverse series of about six cells, are undoubtedly of a larger size than those immediately following, and stain in a different manner; they fail to take safranin stain, when the cells immediately following stain well. These cells are packed with granules of rather uniform size. The succeeding intestinal cells contain numerous yellowish granules of variable size, which are rather irregularly disposed. A notable feature of the intestine is the lining, which is unusually thick, and consists of two elements; an interior thin, refractive membrane surrounded by a non-staining layer nearly as thick as that portion of the intestine containing the granules, already mentioned. In many parts of the intestine this lining, composed of the two above-mentioned elements, occupies fully half the optical longitudinal section. Anus raised, rectum somewhat shorter than the anal body-diameter. The tail begins to taper slowly from some little distance in front of the anus. Behind the anus it tapers somewhat more rapidly, and is conoid to the terminus. The three saccate caudal glands form a close tandem series in the anterior half of the tail. The nuclei of these cells are slung in a rather fine net-work of protoplasm. The lateral fields are fully one-third as wide as the body. The reticulate cell is not yet fully understood. There is a series of rather prominent cells a short distance behind the base of the neck on the ventral side of the intestine which undoubtedly constitutes the renette. In one typical specimen these cells were arranged as follows: First, an elongated-ellipsoidal cell, which failed to take the carmine stain, but contained a distinctly stained nucleolus in its nucleus. This was followed by a cell which stained rather strongly, which in turn was followed by a pair of cells which did not stain, except in their nuclei; these two cells were arranged side by side, and were the largest of the series, being nearly half as wide as the body and nearly twice as long as wide. Behind this pair of cells there was a single cell.
resembling the first member of the series, and behind this one or two others arranged tandem. This entire series occupies a length equal to the length of the neck. From the raised vulva the vagina extends inward and forward. The outstretched ovary contains fifty or more developing ova arranged in double file, except near the blind end, which is located near the middle of the body. The eggs are of large size, elongated, about one and one-half times as long as the body is wide and about two-fifths as wide as long. In all these thus far seen the spherical nucleus is of unusually large size. There is no posterior rudimentary branch to the sexual organs. Well-developed accessory pieces surround the distal ends of the spicula. With them a median piece extends along the spicula and appears to end opposite the body-axis, near the base of the apophysis. The karyokinesis of the spermatocytes shows the arrangement of the chromosomes in sperm-threads, something very uncommon in nemas.

Habitat: Larat, East Indies. Marine. Fig. 79, p. 299.

XI. Order Triplonchia.

80. Triplonchium cylindricum n. sp. Cuticle naked as in the case of nearly all Triplonchia. Cylindroid neck 15 14 5 cm, ending in a conus 11 14 3 cm. vee-conoid head. Amphids more or less protrusile, projecting considerably in all specimens killed with Flemming's solution. (See illustration.) In some respects the amphids are reminiscent of those of certain Meriethidae. Oesophagus mainly cylindroid, but finally expanding to form a pyriform bulb nearly two-thirds as wide as the base of the neck, and having a rather indistinct valve one-sixth as wide as itself. The lining of the oesophagus is so not a very distinct feature. There is no very distinct cardia. The intestine becomes as once about two-thirds as wide as the body. The cells contain numerous refractive spherical granules, the largest of which are about one-sixth as wide as the body, the smallest of which are very much smaller. These granules are packed so closely together as to obscure the details of the histological structure of the intestine. Anus continuous; rectum slightly refractive. The lateral fields have not been clearly seen, but appear to be about one-fourth as wide as the body. Renette unobscured. The neck region is sometimes set off by an almost imperceptible broad, shallow constriction. The spear is nearly vestigial, parallel or nearly functional, and may not merely as a tube through which the food passes. It is not clear what the motive force in deglutition is, as the usual oesophageal bulbous pump is absent. Oesophagus cylindroid or faintly cephaloid. In the larva opposite the excretory pore are to be seen two successive breaks in the lining of the oesophagus, which are probably vestiges of a bulb. At first, the oesophagus is two-fifths, the body one-fourth as wide as the corresponding portion of the neck; the lining is subdistinct, the musculature fine and colorless. There is no cardia. The oesophagus changes gradually into the intestine, as in Aphelenchus. In the larva, the thick-walled intestine gradually becomes three-fifths as wide as the body. Its lining is refractive and in cross-section, it presents one to two cells only, which alternate with each other as in some Rhadidites. The anus is con-
ORDER TRIPLOCYCHA

302

The cuticle is thin, the transverse strike almost impossible of resolution. Except for the cephalic setae, the cuticle is naked. Spermatozoa, and the thin-walled ovary, which is so distinct, are not seen. Though the yellowish, solid, refractive eye-spermae are sublateral in position, they are rather near together. The spermatheca thus far examined do not cause one to make a clear distinction between the oesophagus and the intestine. Connected with the posterior part of the oesophagus are large glandular cells, probably three in number, judging by the number of nuclei. These glands seemed to be homologous with those found in a similar position in Tylenerchus and Aphelenchus, but their actual connection with the lumen of the oesophagus is doubtful, as no connecting duct has been seen. The best interpretation seems to be to consider these structures as a part of the oesophagus, but it is entirely possible that the oesophagus ends just in front of these glands. The thick-walled intestine, which has a very distinct, refractive zigzag lumen, becomes almost at once three-fourths as wide as the body. From the elevated anus, the prominent, cutinized rectum extends forward a distance equal to the anal body diameter. The cells of the intestine contain numerous somewhat variable yellowish granules, the largest of which are one-sixteenth as wide as the body. The caudal glands have not been clearly deciphered, but they probably lie behind the anus in the anterior half of the tail in a loose tandem. They are narrow and elongated. The elongated, granular rectette cell, twice as long as the body, is wide, and about one-third as wide as long, is located six to eight body-widths behind the neck. The single, reflected sexual organs extend forward; the accompanying formula, correct for the larvae, does not pretend to indicate the true form of the developed organ. Males unknown.

Habitat: Clean "white" marine sand, in five feet of water, from a core near the entrance to Buzzard's Bay, Mass., U. S. A. Also from "sea-grass," Key West, Florida. Fig. 83.

34. Doryllium uniforme n. sp. Cuticle naked, very minutely transversely striated. Neck conoid. Spermatozoa, and with a distinct, somewhat refractive posterior swollen part. The oesophagus continues with slight variations until it joins the spine-shaped cardiac bulb, which is two-thirds as wide as the base of the neck, and is separated from the preceding portion of the oesophageal tube by a constriction. This bulb contains, among other things, a spherical nucleus with a distinct nucleus, presumably indicating the existence here of glands like those of Dorylaimus. The narrow intestine joins the middle of the posterior surface of the bulb, and becomes at one about two-fifths
as wide as the body; its cross-section would present only about two cells. These cells contain scattered yellowish granules of uniform size. From the inconspicuous anus the rectum extends a distance longer than the anal body-diameter. The pro-rectum is about four times as long as the corresponding body-diameter, and is readily distinguishable from the rest of the intestine by differences in structure; it appears more transparent and more nearly colorless. Renette unknown. There seem to be very faint indications of the presence of a lateral wing. The lateral fields are about one-fifth to one-fourth as wide as the body. From the rather inconspicuous vulva, the vagina, which is well cut inized, extends inward and backward half way across the body, where it joins the single uterus which extends backward. The reduced ovaries reach half way back to the vulva, and contain ten to twenty ova arranged for the most part single file. There is an anterior rudimentary branch to the uterus which is a little longer than the corresponding body-diameter. Eggs unknown; judging from the full-grown ova they are about as long as the body is wide and about half as wide as long. Single male supplement two body-diameters in front of the anus, four times as far away as the anal pair.

Habitat: Brackish soil on the banks of a marine estuary, Los Patos, California, U.S.A. Diffrers from Dorylaimus in the form of the spear, and the oesophagus. Most species of Dorylaimus have two ovaries. Differences also in the reduced number of supplementary organs; outside the anal pair, there is only one. Differs in material respects also from Telencholaimus, to which it may be compared. Fig. 54.

85. Leptonchus granulosus n. sp. *5.734. 55"*988
Cuticle naked. Its transverse striae resolvable with difficulty into exceedingly minute dots. One of the inner striae seems to correspond to about four of the outer. Cuticle also possessed of inconspicuous longitudinal striae. Neck conoid. Amphids broad, faint, somewhat stirrup-shaped, their anterior contours opposite the labial constriction. The oesophagus begins as a tube about one-fourth as wide as the base of the head, and continues to have this diameter until it finally expands to form the clavate or elongated pyriform cardiac swelling, which is about one-half as wide as the base of the neck. There is an inconspicuous conoid cardia about one-third as wide as the body. The oesophagus is therefore essentially tubular throughout most of its length. It is, however, a trifle wider near the middle, in the neighborhood of the nerve-ring, usually behind it, and at this point there appears to be a slight alteration in the lumen, suggesting in the faintest possible manner vestiges of a median bulb; at its widest part, however, the slender part of the oesophageal tube is not more than one-fourth to one-fifth as wide as the corresponding portion of the neck. At its narrowest part, just in front of the cardiac swelling, it is almost half as wide as it is at its widest part. The lumen of the oesophagus is not a conspicuous feature. The intestine, which becomes at once fully three-fourths as wide as the body, is made up of cells of such a size that its cross-section presents but two of them. These cells are packed with granules of variable size, the largest having a diameter one-eighth as great as that of the body, while the smallest are very minute. The tail begins to diverge from some distance in front of the anus. There are a few inconspicuous papillae near the posterior extremity of the tail of the female. The pro-rectum is of most unusual length, extending to a little beyond the flexure of the anterior ovary, and hence occupying about half the length of the body. It is set off from the front portion of the intestinal tube by a distinct constriction, and differs also in structure. The lateral fields are about one-third as wide as the body. The ventral fields appear to be wider than the lateral, — nearly half as wide as the body, at least appearances half way between the vulva and the anus give rise to this measurement. The traces of the excretory pores are difficult to observe, but they are uniform in the different specimens, and as no other similar "break" in the cuticle is to be deciphered it seems impossible that the single "break" opposite the nerve-ring can be anything but an excretory pore. No indications are seen of the existence of an internal structure connecting with this pore, but the neck, especially the posterior portion of it in front of the cardiac swelling, is occupied by elongated structures, which may be of a glandular nature and connected with the so-called "pore." The slightly elevated vulva is a transverse slit about one-fourth as long as the body is wide. Radiating from its ends are four muscles passing to the submedian fields. The vaginas leads about halfway across the body. The reduced ovaries reach about three-fourths the distance back to the vulva, and contain about two or more ova developing, arranged somewhat irregularly. The elongated eggs are three to four times as long as the body is wide, and about one-fourth to one-fifth as wide as long.

Habitat: Soil about willow trees, Arlington Farm, Va., opposite the city of Washington, D. C., U.S.A. Fig. 55.

86. Axonchium amplicollum n. sp. *5.734. 55"*988
Cuticle naked. The two portions of the oesophagus are separated by a constriction, as shown in the figure; both parts cylindrical. Lining of the oesophagus well-developed, but more or less obscured by the well-marked, rather coarse, colorless musculature in the posterior part. Salivary glands in the posterior part of the oesophagus as in Dorylaimus, one gland emptying into the anterior lumen near the anterior portion of the oesophagus, the others farther back. Anus subconoid, minute; the rectum prominent and cutinized, and one and one-third times as long as the anal body-diameter. The anal mucrds are clearly disclosed. The pro-rectum is five times as long as the anal body-diameter, and set off by a definite but faint constriction. The cells of the intestine contain numerous, colorless, granules of variable size, the largest of which are one-twentieth as wide as the body. Tail of the adult female as shown in the illustration. In the youngest larvae, however, the tail is cylindrical in the
ORDER ANOXONCHIA

posterior half, and in this part, about one-third as wide as at the anus, the terminus being rounded. The coarsely granular lateral fields are one-sixth as wide as the body. Renette problematical. From the small, inconspicuous, faintly elevated vulva, the rather weak, non-cutinized vagina leads inward two-fifths the distance across the body. The elongated eggs are three times as long as wide and twice as long as the body is wide. The tapestry ovary reaches about half way back to the vulva, and contains about twenty ova, the largest of which are arranged single file, while the others are arranged irregularly.

Habitat: Soil about the roots of Lucas da Peru, Brazil. The part of Brazil from which the plants came is unknown. The soil examined was removed from the roots after they were imported into the United States. It is probable that the species is syngonic. Another tropical species, originally described by the writer under the name of Dorylaimus longicollis, from about human roots, Fiji, possibly also belongs to this genus. Fig. 89, p. 306.

87. Oncholatella ocellata n. sp. 12 14 16 17 13> Cuticle naked. Striae almost impossible of resolution. Spent solid, refractive and apparently "structureless" throughout. The two yellowish ocelli are wide apart, their lenses colorless. The oesophagus is at first about one-half, near the nerve ring two-fifths, and finally five-sixths, as wide as the corresponding portion of the neck; the anterior part is cylindrical, the posterior part more or less obscure. The oesophageal region seems to be largely filled with a series of elongated, elevate glands, some granular and some non, and hence of two kinds. The hindmost of these is the largest, and, with reference to the oesophagus lies in much the same way as the larger salivary gland of Tylenchus. There is also a large spherical nucelus in this gland, as in Tylenchus. This is the only one of the granular cells having a large conspicuous nucleus. The non-granular cells are smaller; two or three of them present nuclei. The measurements given in the formula for the base of the oesophagus refer to the posterior limits of these glands. Just in front of the ocelli there are two lateral, external, elliptical, cuticular elements, two-thirds as long as the corresponding diameter of the neck, and one-third as wide as long. These connect backward by means of ducts, and it seems probable that they are connected with the two kinds of glands already described. The two nuclei present closely contained in the neck. The lining of the oesophagus is indistinct, its musculature fine and colorless. No cardia has been seen. The thick-walled intestine, which has a distinct, reflexive, longitudinal lining, becomes at one-sixth as wide as long. The conspicuous rectum is about three-fourths as long as the anal body-diameter; anal muscles are dimly to be seen. The cells of the intestine, of which only two to three would be presented in cross-section, are filled with colorless granules of variable size, the largest of which are one-fifteenth as wide as the body. The anterior tail tapers from the anus to the terminus, and presents a spiracrit about one-sixth as wide as its base. Cuticular glands in front of half of tail. No caudal setae. No cuticle unknown. From the somewhat depressed vulva, the more or less cutinized vagina extends inward three-fifths the distance across the body. An ovum, apparently full-grown and about to enter the uterus, is twice as long as the body is wide, and one-third as wide as long.

Habitat: Eel-grass, Biscayne Bay, Miami, Florida, U. S. A. Flemming to glycerine jelly. Only one specimen—that, a shrunken one—seen. Fig. 87.
ORDER ANAXONCHIA

vagina leads inward nearly half way across the body, where it joins the single uterus, which apparently extends forward. The ovary extends backward past the vulva. Nothing is known concerning the size and form of the eggs.

Habitat: About the roots of citrus trees, Corfu, Greece. Fig. 88, p. 304.

Catalaimus acuminatus n. sp. 1.9 10 19 2.41 3.2 19.5 2.21 3.06 1.5 " Naked cuticle traversed by exceedingly fine transverse striae. Lips when closed exhibiting about a dozen which are barely visible with the highest powers. Onchial arcuate, slender, long, spear-like. Eye-spots two, lateral, refractive, colorless, glistening.

Near the beginning of the pharyngeal tube, each of the three sectors of the oesophagus presents longitudinal lines of yellowish pigment. From some little distance behind the nerve-ring, the oesophageal tubes present longitudinal lines of yellowish pigment. The intestine, which becomes at once three-fourths as wide as the body, is made up of cells of large size, at least some of the cells are of very large size, of such a size that probably two only would be required to build a circumference. Whether there are other smaller cells scattered among these larger cells remains to be determined. The large cells are packed with nearly colorless granules of rather uniform size, having a width about half as great as the thickness of the body wall. While the anus is depressed, its posterior lip is slightly raised. Rectum as long as the excretory tube. The nema tapers gradually from a considerable distance in front of the anus. Near the anus, it begins to taper more rapidly, so that at the middle of the tail, the diameter is only about half as great as at the anus; thence onward, the tail is nearly cylindrical and ends in an elongated spinneret. No distinct traces of caudal glands are to be seen in the base of the anus, but it is assumed that they are located in front of the anus. Observe indications have been seen of their presence half as far in front of the anus as the termi- nus is behind it. The lateral fields have not been distinctly seen. The location of the remte cell remains undetermined. This description is derived from a young female, and all that can be said is that the ovaries are probably double and reflexed.

Habitat: Marine mud and sand, Noumea, New Caledonia, and Biscayne Bay, Fla., U. S. A. Other species of this genus occur in the Indian Ocean and in the Mediterranean Sea. Fig 80.

Bolbella tenuidens n. sp. Transverse striae excessively fine, more readily seen in the subcuticle with high powers under favorable conditions. Longitudinal striae between 35.6 to 36.3, "longus" 35.6 to present throughout the length of the body. Body wall massive, occupying one-third the radius. As 3.5 4.5 19.5 3.5 4.5 2.5 19.5 compared with related species the anterior chamber of the pharynx is somewhat more foreshortened. There are two to three
dozens very long and very slender cervical setae, those toward the head end being nearly twice as long as the cephalic setae, of them than are shown in the illustration. Caudal tubes exist in the oesophagus, the granular branches of which may be seen more particularly between the oesophageal bulb; a duct appears to lead to the pharynx. A cross-section of the intestine would present four to six cells. In the female, from the more or less continuous anus of which, however, the posterior lip is slightly elevated, the inconspicuous rectum extends inward a distance equal to the anal body-diameter. A narrow renette cell exists two to three body widths behind the cardiac on the ventral side. The slightly elevated vulva is of medium size, and leads to a large tubular vagina, at first at a sharp angle to the ventral surface and then leading obliquely forward. The wall of the vagina is well cutinized. Each branch of the two-horned uterus is about one and one-half times as long as the body is wide. Two eggs have been seen in a uterus at one time, each about twice as long as the body is wide. The spherical spermatophores existing in the uterus are about one-sixteenth as wide as the body. The broad, more or less cylindrical ovaries extend two-fifths the way back to the vulva, and contain eight ten countable ova arranged for the most part irregularly. The two supplementary organs of Bolbella, like the similar organs of Eurythoma, are connected with large glands, one to each supplement. One of these glands is very well shown in the illustration at pl esp c'.

The gland is long and unicellular and its nucleus is shown at ncl pl. A natural supposition is that these two supplements are cup-shaped organs attachable by suction. The supposition appears, at first thought, to find support in the existence of the "anchors," which are manipulated by special muscles. It is rather difficult to harmonize this theory with the existence of such large glands, so much so that one feels inclined to give up all idea that suction plays any part in the functioning of these organs. The so-called cups of the supplements are
ORDER ANAXONCHIA

The males of Bolbella seem to be considerably less common than the females.


Sublime to balsam Resembles Symlococestoma Bastian, but differs materially in the structure of the posterior part of the oesophagus, as well as in the absence of eye-spots.

The males of Symlococestoma have no supplements.

The strongly tapering neck of Bolbella results in a head of small size. Notwithstanding its small size, one is immediately struck by its strong resemblance to the head of Eurystoma.

The males of Symplocostoma have no supplements. The strongly tapering neck of Bolbella results in a head of small size. Notwithstanding its small size, one is immediately struck by its strong resemblance to the head of Eurystoma.

The strong resemblance to the head of Eurystoma is especially marked in the oesophagus and the pharynx, located on the dorsal side of the lateral lines.

While the pharynx is divided into two more or less distinct chambers, the division line is not marked by transverse rows of denticles. Fig. 90a, p. 300; Fig. 90b.

The oesophagus has the same diameter throughout its anterior half, after which it begins slowly to expand and finally is two-thirds as wide as the base of the neck. There is a distinct, blunty convex conoid cardia, nearly half as wide as the base of the neck. The intestine, which is separated from the oesophagus by a deep constriction, becomes at once three-fourths as wide as the body. It is rather thin walled and in cross section presents about six cells. These cells contain scattered, yellowish granules of variable sizes, so arranged as to give rise to an obscure tessellated effect.

The largest granules have a diameter nearly equal to the thickness of the body wall. Posterior lip of the anus strongly elevated. Rectum equal in length to the anal body-diameter. Rectum elongated, located a little distance behind the cardia. The lateral fields appear to be rather narrow; they are characterized by the presence in them of numerous, rather scattered, yellowish granules, which are more numerous toward the edges of the field, and which, therefore, define the fields more distinctly than is usually the case. At the base of the head, the fields are seen to widen out and terminate in a rounded contour; the margin of this contour marks the position of the amphibids. The granules found along the lateral fields appear also in submedian longitudinal rows outside these fields. Thus, on either side of the lateral fields, there is a single distinct row of these granules; on the submedian line, another very distinct assemblage of granules, consisting of several irregular rows. Then comes another scattered faint row; then a ventral or sub-ventral assemblage consisting of several rows. There is thus produced on the neck as well as elsewhere quite a distinct longitudinal ph"
The convex-conoid tail tapers from the anus to the spinneret, which is armed with submedian setae. The caudal glands lie in front of the anus. There are three or four practically no caudal setae. The lateral fields are therefore two-fifths as wide as the body and contain large cellular elements. Anoncholaimus has eight caudal glands, six emptying into the anterior part of the pharynx opposite the bases of the setae and two smaller, a little farther back on the dorsally sublateral lines. The granular contents of the ducts of these glands, increased slightly in volume, form a prominent feature of the head. These ampullae move back and forth during the various movements of the head. Hence the specific name "mobilis." The caudal glands lie behind the nerve-ring, since their ducts have been followed backward to the nerve-ring. There are also ducts of glands to be seen in the ventrally submedian sectors of the oesophagus. The pyriform rennette cell, which lies a very short distance behind the base of the neck, empties through a rather distinct ampulla twice as far back as the base of the pharynx. The narrow nerve-ring is accompanied by large distinct nerve cells arranged in groups. From the rather large and conspicuous, more or less elevated vulva, the large muscular, non-terminating vagina leads inward to the two straight uteri. The eggs are twice as long as the body is wide, and two and one-half times as long as wide. Judging by their size when empty, the uteri are adapted to receive one egg at a time, possibly two. The posterior ovary is a little the smaller; both are more or less cylindroid, finally tapering, of medium size, and reach three-fourths the distance back to the vulva. The ova in them are arranged single file. An ovum about to enter the oviduct is two to three times as long as the body is wide, and about one-fourth as wide as long.

Habitat: Soil about the roots of living plants imported from Brazil into the United States. Fleming to glycerine jelly. Fig. 94.
ORDER ANAXOCHIA

95 Digonorchus univitus n. sp. Possibly the transverse striae are resolvable into exceedingly minute markings. Cuticle naked except for the cephalic setae. Lips three, possibly very faintly double, ovate. Anteriorly the neck is convex-conoid. The oesophagus has not been well seen but appears to be more or less cylindrical; its diameter at the base is about half as great as that of the base of the neck. Its lining is subdistinct, its colorless musculature fine in texture. The more or less thick-walled intestine, which has a faint lumen, becomes at once half as wide as the body. Cardiac colurn one-third as wide as the base of the neck. From the more or less elevated anus, the prominent, culminating rectum is about as long as the anal body-diameter. The conoid, conic tail tapers from the anus to the rather simple spinneret. The rather broadly sacculated caudal glands are packed behind the anus in the anterior third of the tail; they empty by separate ducts. The lateral fields are one-third as wide as the body. Renette unknown. The nerve-ring is accompanied by obscure nerve cells. From the more or less continuous, incomprehensible vulva, the vagus extends inward three-fifths the distance across the body. It is muscular and more or less similar to the tail. The medium-sized, tapering ovaries reach half way back to the vulva.

Habitat: Beach sand, Squinkocket, Martha's Vineyard, Mass., U.S.A. Fleming to glycerine jelly. Fig. 95.

96. Ypsilon exilis n. sp. There are a very few cervical setae about half as long as the neck is wide. Three flat, minute, confluent lips bear a ciretuse of six forward-pointing or somewhat spreading papillae around the mouth opening. Though there are six nerves, one to each papilla, they are not precisely equidistant, but seem to be arranged in three, somewhat distinct pairs. Pharynx relatively strongly cutinised. In optical contour, the anterior end of the oesophagus is more or less crescent-shaped; this cup-shaped head is fixed obliquely on the strong, straight element that forms the main portion of the dorsal wall of the pharynx. The head of the oesophagus is yellowish in color. The neck is cylindroid posteriorly, convex-conoid anteriorly. The oesophagus, narrow and more or less cephaloid in form, ends in a somewhat cylindroid cardiac swelling, two-sevenths as long as the neck, and three-fifths as wide as wide as the base of the neck. At the nerve-ring, the oesophagus is one-third, just in front of the cardiac swelling also one-third, as wide as the corresponding portion of the neck. The lining of the oesophagus is rather prominent. The colorless musculature of the oesophagus is fine in texture; in it, traces of oesophageal glands have been seen. There is a distinct, refractive, cylindroid caudia, two-sevenths as wide as the base of the neck. The intestine, which is thick-walled and has a faint, zig-zag lumen, gradually becomes three-fourths as wide as the body. The cardiac colurn is one-third as wide as the body. The anus is elevated, and the rectum is one and one-fourth times as long as the anal body-diameter. The intestinal cells are packed with granules, such as are often seen in Aphelenchus; the largest of these are one-eighth as wide as the body. These granules tend to be larger posteriorly than anteriorly, and sometimes appear to be polyhedral. The posterior part of the body tapers from in front of the anus, at first conoid then convex-conoid, and ends in a spinulus one-sixth as wide as the base of the tail. The ellipsoidal to broadly sacculated caudal glands are packed in a close band behind and opposite to the anus in the anterior third of the tail. Their large, distinct ampullae are two-sevenths as long as the tail. There are one or two slender setae at the middle of the tail, and near the tip of the tail. The lateral fields of the anal body are three-fifths as wide as the body. The much elongated conoid tail lies about one-third the width behind the neck. The frill, strongly arcurate, rather slender, tapering, subsetose spinules are cephalised by a constriction on the ventral side in such fashion that the proximal ends appear to be more or less barbed. The simple, frill, very slender, arcurate accessory piece is one-third as long as the spinules and presents a faint apophysis; its proximal end, like those of the spinules, lies dorsal from the body-axis. At first it is parallel to the spinules, then recedes and bends away at an angle of ninety degrees. There is three and minute supplementary organs in front of the anus, occupying a space one and one-half times as long as the body-diameter.—Little more than insertions. The posterior end of these is opposite the distal ends of the spinules. The distance between the first and second is equal to two-thirds, that between the second and third, to one-half, the body-diameter. At the posterior end of the middle fifth of the tail there is a somewhat raised small area supplied with two subventral nerve endings.

Habitat: Coarse sand, Beach, Devil's Island, Woods Hole, Mass., U.S.A. The sexual organs are difficult to decipher on account of the granules in the intestine. It does not seem advisable to refer this species to Aemacolaimus Filippov. The following differences may be noted: (1) The cuticle is coarsely striated. (2) The oesophageal setae in one ciretuse only. (3) The ampamides are not "split." (4) The pharynx is not open. (5) The dorsal organ is "Y"-shaped. Though possibly the Filippovian specimen might have been referred to Aemacolaimus de Man. Fig. 96, p. 314.

97. Gonionchus villosus n. sp. Annules separated by strongly refractive lines. Neck conoid in the anterior half. About twice as far from the anterior extremity as the amphids are four submedian groups of hairs, which are longer than the cephalic setae. These groups consist of three each, arranged one in front of the other, the members being separated by a distance equal to the width of one of the annules. Similar submedian long and slender hairs occur throughout the length of the body and are so numerous as to constitute a very striking feature. The amphids at first appear "O"-shaped; in reality, however, they are spiral. The terminal flaps are hinged to the lips, and the anterior portion of each lip apparently is hinged to the main portion of the wall of the head, which is itself unusually thin. Oesophagus apparently more or less plate-like. The oesophageal glands continue to have the same diameter until after it passes through the nerve-ring; thereafter, it expands very little so that finally it is about two-thirds as wide as the base of the neck. There is a distinct conoid cardia, having a base about one-third as wide as the base of the neck. The intestine becomes at once about two-thirds as wide as the body. It is rather thick-walled, and its cross-section would present about four to six cells. The lining of the intestine is refractive, so that the lumen is readily followed; in fact it is a rather interesting feature. The cells contain scattered yel-
lowish granules of variable size, arranged irregularly. The posterior lip of the anus is slightly raised. Rectum only about two-thirds as long as the anal body. The tail is corded in such a fashion that, at a distance from the anus equal to eight times the anal body-diameter, it has a diameter about one-fourth as great as at the anus. The remainder of the tail has been lost from the specimen from which the description was drawn and is therefore of unknown form; hence the dimensions given in the formula must be taken prelud accordingly. The tail is just as distinctly striated as the body. The lateral fields are about one-third as wide as the body. It is probable that the rectocele is located at a distance behind the base of the neck about equal to two body-diameters. At this point the gland is elongated. At the point where the striate ceases on the head, the cuticle diminishes very rapidly in thickness, so that opposite the dorsal tooth, it is not more than one-third as thick as a little farther back; thence onward, it is thin to a point half way between the circle of setae and the axis of the mouth opening. At this point, the hard cuticle ceases and there is a very minute, faint groove encircling the lip-region. The lips come almost together so as to form a vestibule having a width about one-third as great as the diameter of the circle of setae. The tissues of the lips apparently reach back a little farther than the apex of the dorsal tooth, and their limits are rather easily noted on account of the fact that they attract carmine stain more than the surrounding tissues do. The lip-region appears to be longitudinally striated internally, and probably to consist of about a dozen elements folded together. When the mouth is open and the lips expanded, the amblypods become more nearly circular. When the lips are closed, the vestibule widens out but little in front of the dorsal tooth, whose apex lies in the axis of the vestibule. The pharynx is surrounded by muscles which appear particularly to that, as is indicated by the fact that they are separated from the oesophagus by a broad but faintly distinct constriction. The oesophagus continues to have the same diameter until near the nerve-ring, where it diminishes somewhat in diameter. Very soon after passing through the nerve-ring, it enlarges, sometimes rather suddenly, to form the elongated posterior three-fifths of the organ. This enlarged part averages to be about three-fifths as wide as the corresponding portion of the neck, and contains a massive lining, which, when viewed in optical section, occupies one-fifth of the diameter. This enlarged portion of the oesophagus is divided into three regions by breaks in its radial muscle, of which one region occupies nearly the whole of the anterior half. The other two parts are of equal size. The lining of the oesophagus is quite distinct in the narrow portion, it is considerably less so in the wider portion, and ceases a short distance in front of the posterior end of the oesophagus. Cardiac collum less than one-third as wide as the base of the neck. For a short distance, the intestine is composed of small cells differing from those which make up its main part. These cells stain more strongly with carmine and contain nuclei of relatively larger size. This region probably may be regarded as a sort of cardia. The intestine becomes almost at once two-fifths as wide as the body. Its cross-section would present about eight cells. The cells are packed.
with numerous yellowish granules. In the body cavity at the cardiac collum, there are three ellipsoïd group of cells, two dorsally submedian and one ventral or nearly so. These groups contain eight to ten nuclei, and one of them is seen to be connected to a distinct, refractive strand, extending forward along the surface of the oesophagus. These groups of cells have their nuclei close together and seem to have a general membrane covering them. In addition to these groups of cells, there are two other granular bodies, ventrally submedian, each containing a single, strongly staining nucleus, and a second body which does not stain so strongly. The structure of these latter is suggestive of that of the ordinary renzette cell, but their connections have not been made out. Rectum somewhat longer than the anal body diameter. The three caudal glands are arranged in a close tangle in front of, opposite to, and behind the anus. Each is a large cell with a protoplasmic network, in the midst of which the single nucleus is along. The lateral fields are about one fourth as wide as the body and are composed of two ranges of cells with a space between them, in which lie model belonging to cells of a different group. Renette unknown. From the slightly raised anus, the accurate tail is conoid to the terminus, which has a diameter about one third to one half as great as that of the base of the tail. From the very slightly elevated vulva, the well outlined vagina extends fully half way across the body. The ovaries reach half way back to the vulva and contain ten to fifteen ova arranged, for the most part, single file. The moderately thin-shelled eggs are twice as long as the body is wide and one-third as wide as long. They occur in the uteri one at a time. The spermatocysts in the uterus are one-seventh as wide as the body. The conoid, accurate tail of the male begins to taper from a short distance in front of the anus. The six supplementary organs occupy a distance equal to the length of the tail. The postterial supplement is nearly opposite the posterior third of the spicula; the second, third and fourth succeed each other without intervening spaces, in such a way that the third and fourth are pretty nearly opposite the proximal ends of the spicula. The fifth is separated by a greater space from the fourth, and the sixth is about as far from the fifth as the fifth is from the fourth. The fifth and sixth are of smaller size than the others, the inconspicuous sixth being the smallest of all. Their spicules are more transparent than the other portions. An unusual feature is the presence of nerve endings between the organs. It is possible that the anus is present in any described, there is another inconspicuous organ of somewhat the same character. The strongly accurate, somewhat acute, yellowish spicule are about twice as long as the anal body-diameter. They appear to be widest in the middle and to taper both ways. The ephalophoric portion of the spicule are cut off obliquely. The proximal end lies near to the dorsal side of the body-axis. The accessory pieces are for the main portion of their length not very conspicuous. Surrounding the distal ends of the spicule, however, there is a rather prominent portion which must be reckoned a portion of the accessory apparatus. Oblique copulatory muscles are present for a distance twice as great as the space occupied by the supplementary organs. The ejaculatory duct is about one-third, and the vas deferens a little more than one-third, as wide as the body. It remains uncertain whether there is one testis or two, but the evidence seems to favor the suggestion that there is only one, and that its blind end lies about as far behind the base of the neck as the nerve-ring is in front of it.

Habitat: Marine. Belmar, N. J., U. S. A., below low tide mark in beach sand. Female unknown. Anaxonchium bears considerable resemblance to Cyatholaimus, but differs, among other ways, in the almost obsolete amphid (?), the retracted testis, and in the large number of small supplementary organs. Fig. 99.

99a. Bolbolaimus pellucidus n. sp. Type species. Naked except for the setae on the head; possibly there are very inconspicuous wings. Lips subdistant, the region elastic and finely subdivided. Margin of the lip-region serrated by the forward projection of about fifteen papillae (?) with minute bristles outside the serrations. The appearance is as if each papilla is armed with a pair of minute
321 ORDER ANAXONCHIA

b. Bolbolaimus punctatus n. sp. 

Striae resolvable into rows of dots, of which about every third row is a trifle coarser, thus indicating the real width of the annules. Labial papilla six setae, setose, about one-third as long as the oesophageal setae. Around the mouth, there are fine, longitudinal striations due to foldings in the vestibule. The penial walls of the pharynx are well-cutinized. There are two very small ventrally submedian projecting onchia opposite the dorsal onchia. The oesophagus near the nerve-ring is two-fifths, just in front of the cardiac bulb a little more than two-fifths, and finally three-fourths, as wide as the base of the neck. This latter measurement is the diameter of the somewhat elongated cardiac bulb, which is two-sevenths as long as the neck. There is an obscure, elongated, two-parted valve in the cardiac swelling, one-third as wide as the swelling itself. The cardiac valve is divided into three parts, corresponding to breaks in the musculature, the anterior part inconspicuous, the other two each occupying nearly one-half the length of the bulb. The thick-walled intestine becomes at once two-fifths as wide as the body. Its cross-section would present three to four cells, containing scattered granules of variable size. The longest of which are about one-twenty-fifth as wide as the body. Cardiac collum one-fourth as wide as the base of the neck. From the conch, inconspicuous, the rectum extends inward a distance two-thirds as great as the body-diameter. The conoid tail tapers from the anus to the blunt, conoid, symmetrical, unramified spiculae. The large sacculi on the lateral sides are one-fourth as wide as the body. The elliptical, non-granulate onchia, one body-width beyond the neck, is one-half as long as the body and five-sixths as wide as long. From the small, inconspicuous, conical, the rather weak vagina extends inward two-fifths the distance across the body. The elongated eggs are as long as the body and three-fourths as wide as long, and are packed three to five in each uterus at once. The tapering ovaries contain about twenty eggs arranged single file.

Habitat: Marine sand, Nobsca Beach, Woods Hole, Mass., U. S. A. Flemming to glycerine jelly. Fig. 100b.

101. Acanthonchus viviparus n. sp. There are distinct wings, whose presence is indicated by about four to six longitudinal striations, resolvable, at least the outer ones, into rows of dots. The wings extend from near the head to near the tail. Neck conoid Setae two- (or three-) jointed. The lip-region appears to be divided into twelve parts, or into six parts, each of which is double. The mouth cavity is cystiform and shallow when the lips are closed and is entered the testes two-thirds, as wide as the corresponding portion of the body, but the testes taper so that at their blind ends they are only one-half as wide as the body. The various regions of the male sexual organs are separated from each other by narrow channels. After synapsis, the spermatozoa grow and become granular.

Habitat: Sand, below low tide mark, Belmar, N. J., U. S. A. Sublime to balsam. Fig. 100a, p. 320.
through a narrow vestibule. The cavity itself is very small, and a good deal wider than it is high when the lips are closed. In fact, when the lips are closed they appear to form a depression on the front of the head, so that their interior margins actually rest on the dorsal tooth and on the base of the pharynx. The pharynx actually continues to twice the depth indicated in the formula, though when the mouth is closed this posterior region appears to be very similar to the lumen of the oesophagus. The oesophagus swells a little in the anterior third, then diminishes almost imperceptibly, and finally swells toward the posterior extremity where it is two-thirds as wide as the base of the neck. The thick-walled intestine becomes at once two-thirds as wide as the body, and expands so as to be three-fourths to four-fifths as wide as the body. Its cross-section would probably present about eight cells. The elongated ventral gland lies immediately behind the cardiac constriction. The lateral fields are about one-third as wide as the body, and are composed mainly of a double row of very prominent ellipsoidal cells, which in the females at least, may be most closely seen in the region of the neck. From the slightly raised vulva, the vagina leads inward about half way across the body. The uteri are generally about one and one-half times as long as the neck, and contain numerous developing eggs or embryos. The ovaries are reflected for a distance about twice as great as the body-diameter, and contain a dozen or more ova arranged in several series. This species is viviparous. Tall of the male is very much like that of the female, but more arcuate. Its terminus has a diameter one-fifth as great as the diameter of the base of the tail. The equidistant supplements are of unequal size, those more distant from the anus being much the larger. The first is held a short distance in front of the cardiac bulb. The thick-walled intestine becomes at once two-thirds as wide as the body, and expands so as to be three-fourths to four-fifths as wide as the body. Its cross-section would probably present about eight cells. The elongated ventral gland lies immediately behind the cardiac constriction.

Habitat: Marine mud, San Pedro, California. Possibly another species exists at Woods Hole, Mass., U.S.A. Sublime to balsam. Fig. 102, p. 323.

102. Xenonema obtusum n. sp. Striae resolvable with high powers into rows of dots or elongated markings which are altered somewhat in the lateral field, where there is a wing extending from near the base of the neck to the base of the tail. There are setae on all parts of the body, but they do not appear to be very numerous. The oesophagus continues to have the same diameter until near the posterior end, where it contracts slightly and then expands to form the pyriform cardiac bulb, four-fifths to five-sixths as wide as the base of the neck. There is no cardia. The intestine at first is only one-fourth as wide as the oesophageal bulb. Its cross-section presents about four or five cells; that those next the oesophagus are physiologically different from those following is shown by the way in which they stain. The intestine soon enlarges so that its maximum diameter is twice as great as that presented near the bulb, but nowhere does the intestine become more than about half as wide as the body. Its cells contain a few yellowish or brownish granules of variable size, the largest of which have a diameter about equal to the distance between two striae of the cuticle, the smallest being not more than one-tenth as wide; otherwise, the cells of the intestine are very transparent so that their nuclei can readily be seen. These latter are of large size and each presents a distinct nucleolus; the average diameter of one of these nuclei is rather more than double the distance between two successive striations. The anus is elevated; the rectum is two and one-half to three times as long as the anal body-diameter. Immediately behind the anus, the tail diminishes abruptly in diameter, and in this region for a short distance near the anus on the ventral surface, the striations of the cuticle are much less conspicuous. The location of the excretory pore and the ventral gland remains uncertain, but it appears possible that the latter lies opposite the anterior extremity of the a body-diameter. The lateral fields are about one-fourth as wide as the body, corresponding approximately in width, at least in the anterior part of the body, with the alterations in the transverse striae which exist along the sides of the body. The tail is conical from a short distance behind the anus. Behind the anus, the tail diminishes so rapidly in diameter, especially on the ventral side, that it becomes almost at once only about two-thirds as wide as at the anus; thence onward, it is conical. The three caudal glands are located in a tandem series in front of the anus. From the enormously developed vulva, the vagina leads inward and forward at an angle of forty-five degrees with the body-axis a distance equal to the span of eight to ten striae. The walls of the vagina are brownish, thick, and highly refractive. There is a single uterus connected with two short ovaries, each containing three to four ova. This entire system of organs is clustered near the vulva and occupies a distance about five times as great as the average body-diameter. The size and nature of the eggs remains to be discovered. Overhanging the vulva is a flap-like expansion of the cuticle which adds much to the ventral prominence. Tissues of the body-wall are contained also in the cavity of this peculiar expansion of the cuticle. Owing to the peculiar development in this region, the diameter of the body here is more than twice the average body-diameter. In fact
these structures are so very peculiar as to suggest abnormality, but as there is no evidence of any disease or malformation in the single, very transparent specimen examined, it seems best to regard it as the normal form of a very exceptional species.

**Habitat:** Salt River, Jamaica, in six inches of water. Fig. 102, p. 223.

103. **Amphispira reticularispha a n. sp.** - Contour plain, or exceedingly finely erenate. Apparently there are very faint sub-oophial setae near the base of the "cuvate." At the mouth opening of the single specimen examined there are three punctate spherical elements, as shown in the illustration. The significance of these remains problematical; while they may possibly be fixation products, such a supposition is doubtful. Neck conoid. The oesophagus retains the same diameter until it expands to form the flabelliform cardia bulb, which has a faint valve one-third as wide as itself. There appears to be an almost imperceptible break in the massulae near the middle of the oesophagus, and a corresponding very slight swelling. The thick-walled intestine has a faint lumen and soon becomes one-half as wide as the corresponding portion of the body. Its cross-section presents few cells. From the apparently continuous anus the prominent rectum extends a distance equal to the anal body-diameter. The scattered to numerous, spherical granules found in the cells of the intestine are of variable size, the largest being one-thirty-sixth as wide as the body. Tail acutate, coiled, ending in a spinceret one-third as wide as its base. The broadly truncate caudal glands are located opposite to and behind the anus in the anterior third of the tail. The lateral fields are one-third as wide as the body. What appears to be the rectal cell is located about three body-widths behind the neck; it is one-third as long as the body and one-half as wide as long. The location of the excretory pore remains unknown. Nerve-ing oblique. From the location of the rudimentary sexual organs in the single young specimen it seems probable that they will develop to be double and symmetrically reflexed.

**Habitat:** Soil, Arlington Farm, opposite the District of Columbia, U. S. A. Fleming in glycerine jelly. This species almost seems out of place in the habitat in which it was discovered, as it is most closely related to marine forms. Fig. 103.

104. **Microeces cephalatum n. sp.** - Neck short, cylindroid. There seems little doubt that the mouth cavity is armed with a single, dorsal tooth, which can be placed so closely against the dorsal wall of the pharynx as to be difficult of detection, although the tooth itself is of considerable magnitude. It appears to have an acute apex, located opposite to or a little behind the labial constriction. Oesophagus cylindroid, ending behind in a prolate or pyriform cardia bulb four-fifths as wide as the base of the neck. Caecum faint. The intestine, which joins the middle of the posterior surface of the cardia bulb, is at first about one-third as wide as the neck. It widens out gradually so as to become about half as wide as the body, and its cross-section would appear to be composed of about six to eight cells containing yellowish granules of rather uniform size. The lateral fields are about one-fourth as wide as the body. Just behind the base of the neck, there are cells which contain a little more strongly than the other structures—possibly retentive cells. The tail of the male is conoid to the terminus, where it has a width one-fourth as great as at its base. The caudal glands seem to be located in the base of the tail. The presence of a series of ventral supplementary organs is indicated by corrugations occurring in the cuticle on the ventral surface when the posterior extremity is inured. This series extends from the anus forward a distance about equal to twice the length of the tail, and must be composed of about twenty elements. Each probably consists of an inconspicuous modification of the ordinary cuticle, in the midst of which there is a nerve ending. In front of the anus on the ventrally submedian lines there are series of setae, each seta being nearly one-third as long as the body is wide. There is one of these setae in front of the anus on each side, a second pair nearly opposite the proximal ends of the spicula, and so on. Similar setae occur on the anterior two-thirds of the tail on the submedian lines. When seen in profile, the spicula appear at the middle to be about one-third as wide as the body. They taper rapidly to the acute distal extremities. The proximal ends are slightly arcuate in a ventral direction. Near the proximal extremities there is a break in the framework on the ventral side. The framework of the spicula is rather frail, considering the size of the spicula themselves. Muscular fibers appear to pass from the inner free end of the accessory piece backward to the ventral surface of the anterior portion of the tail.

**Habitat:** Punta Arenas, Pacific Coast of Costa Rica. The intestine contained a considerable number of diatoms. Sublimated to balsam. Fig. 104.

105. **Mesoderus cylindricollis n. sp.** - Naked cuticle traversed by exceedingly fine, plain transverse striæ. Neck cylindroid. In certain aspects, the amphids appear to consist of one circllet within another, but are in reality true spirals. No doubt the papillae surrounding the mouth opening correspond with folds in the lip-region; these, however, are so very minute as to be difficult of resolution. From the base of the osphradium backward, the pharynx is narrow and tapering, and joins the lumen of the oesophagus in an indefinite way at a point distant from the anterior extremity nearly equal to the distance of the front of the head. From behind the pharyngal swelling, the oesophagus continues with about the same diameter until it expands to form the rather obscurely pyriform cardia bulb, which is fully three-fourths as wide as the basal body of the neck, and contains a relatively large through rather simple valvular apparatus, having a diameter half as great as that of the bulb itself. This valve is about twice as long as wide. The relatively narrow intestine joins the middle of the posterior surface of the cardia bulb and soon enlarges so as to be two-fifths as wide as the body. There is no distinct cardia. In cross-section, the intestine presents six to eight cells. The lateral fields are about one-fourth as wide as the body. Nothing is known concerning the rectotene or the excretory pore. The nerve-ring surrounds the oesophagus squarely. The tail of the male is strongly conoid and conoid from the prominently raised anus. The terminus is blunt and bears a simple spinule. The caudal glands are packed together in the anterior third of the tail, extending a little in front of the
Order Anaxonchia

The twenty-five supplements are rather simple and when the body is curved, take on the form of semi-cylindroid, transverse elevations, the distance between them increasing anteriorly. There are two opposite the spicula and a third a short distance in front of the proximal ends of the spicula; and then for a distance equal to four times the length of the tail, the organs are separated by spaces not greater than their own width. Hence forward, the organs are separated by wider spaces, and occasionally one of the series appears to be missing. The two anterior ones are separated by a distance about twice as great as the width of one of the organs. The entire series occupies a distance about eight times as long as the tail. No special papillae or setae have been seen on the tail end, either in front of the anus or behind it. The proximal ends of the strongly arcuate, slender-looking spicula appear to lie nearly opposite the body-axis. Apparently connecting the cephalic expansions with the anus are slightly curved, refractive lines, indicating that the spicula may be broader than would appear from an examination of only the more striking portions of the framework. Accessories parallel to, and two-fifths as long as the spicula. Ejaculatory duct one-third as wide as the body. The blind end of the testis is about half as wide as the body.

Habitat: Mud, tide pool, Portsmouth, N. H., U. S. A., near low tide mark. This genus resembles Onyx Fig. 105, p. 325. 106. Polysigma uniforma n. sp. Cuticle, if striated at all, very finely so. Body naked except for the setae on the head. Lips minute, more or less confluent, relatively thick, six and double, or possibly twelve. Near the nerve-ring and just in front of the cardiac bulb, the oesophagus is one-half, and finally three-fourths, as wide as the corresponding portion of the neck, this latter figure being the measurement of the pyriform cardiac bulb. The refractive lining is one-twentieth as wide as the oesophagus. In the posterior half of the oesophagus there are pigment granules in the fine-textured musculature. The two elongated masses of brown pigment granules begin suddenly at the middle of the cardiac bulb and end suddenly near the middle of the neck. There are quite prominent, pigmented submedian glands in the oesophagus, but apparently no dorval one. The thick-walled intestine, which has a faint lumen, because at once half as wide as the body, and in cross-section would present three to four cells. Very minute, but distinct, yellowish granules of uniform size are scattered in the intestinal cells. The cardiac collum is two-fifths as wide as the body. The medium-sized nerve-ring is accompanied by distinct nerve cells, not very definitely grouped. From the more or less elevated vulva, the fairly-well culminated vagina extends inward half way across the body. The eggs are probably about three times as long as the body is wide. The broad, tapering ovaries, which contain about ten ova arranged mostly in single file,—but irregularly near the blind end,—reach about half way back to the vulva. The tail of the male is oval, to the spinneret, which is nearly one-third as wide as the base of the tail itself. The slightly yellowish, rather strong, subblender, rather minute spicula appear to have their slightly expanded proximal extremities nearly opposite the body-axis. There are seventy-six yellowish, refractive supplementary organs in two subventral rows of thirty-eight each. They are subequal in size, but somewhat wider apart anteriorly. They appear to be more or less protractile. Ejaculatory duct one-third to two-fifths, the testis one-half, as wide as the body. The testis is cylinidroid, but tapers near its blind end.

Habitat: Marine mud, twenty-five fathoms deep, Woods Hole, Mass., U. S. A. Fig. 106a, p. 325; Fig. 106b.

107. Alaimonema multicinctum n. sp. Seta (3) 17.5 to 35. The stigma is 1500 to the millimeter, resolvable with difficulty into very exceedingly fine dot-like elements. Cephalic and subcephalic setae sixteen, in four sets of four. Cervical setae scattered, the first five to eight larger than the cephalic setae, the others smaller. Somatic setae scattered, inconspicuous, about one-twelfth as long as the body is wide. In two series on the borders of the lateral fields, every twenty to thirty annuleses throughout the nema, there are round, pore-like markings, twice as wide as the annules. The two rows of pores opposite the lateral fields are removed from each other by a distance about equal to three-fifths the body-diameter. There are no lips. The simple, more or less triangular pharynx is so small as to be very easily overlooked. The three very small onchia are more or less equal in size. Their forward-pointing, acute spiculae are opposite the anterior borders of the amphides. The oesophagus is at first three-fifths, near the nerve-ring and in front of the cardiac bulb two-sevenths, and finally three-fourths, as wide as the corresponding portion of the neck. The pyriform cardiac bulb contains a more or less spheroidal, simple valve, two-sevenths as wide as the bulb itself. The oesophagus has a subdistinct, narrow lining, and a fine musculature. The intestine, which has a more or less thick wall and a faint lumen, soon becomes half as wide as the body. In cross-section it presents but few cells. The cardiac collum is one-fourth as wide as the base of the neck. The widest of the variable, colorless granules found scattered in the intestinal cells are twice as wide as one of the annules. The longitudinal fields are three-fifths as wide as the body. The body is concealed from the rather prominently raised anus. The large, rather frail, tapering, somewhat blunt spiculae, at their widest parts, near the proximal ends, are one-fourth as wide as the corresponding portion of the body. There is a rather frail, slender accessory piece. The elevated, "campanulate," subequidistant supplementary organs begin opposite the proximal parts of the spicula and are stationed at a...
distance from each other varying from one-sixth of one, to one, entire body-diameter. The organs are nearly as high as they are wide, and are more or less asymmetrical. Each is connected with an internal, refractive piece, a little farther forward. They somewhat resemble the well-developed supplementary organs of Chromadora. The ejaculatory duct is one-half, the vas deferens three-fifths, as wide as the body. A considerable portion of the male sexual organs is filled with spherical granular spermatocytes, one-third as wide as the corresponding portion of the body and extends forward to near the middle of the body, where it joins the testes. The organs are nearly as high as they are wide, and are more or less asymmetrical, having a distinct ectosaccus.

Habitat: Beach sand, Bathing Beach, Woods Hole, Mass., U. S. A. Fleming to water. Fig. 107, p. 327.

108. Copophonchus equisculptus n. sp. Transverse striae exceedingly minute; the cuticle is also longitudinally striated. The some-what cylindrical neck is almost imperceptibly convex-conoid in its anterior part. Cuticle relatively thicker on the head. A few short setae occur here and there on the neck. There appear to be three somewhat confluent lines of papillae on their outer margins, probably the number of six. There are two dark-brown dorsally placed granules on the ventral portion of the oesophagus a linear collection of pigmented granules, from which there also extends backward a line of scattered granules. Similar granules occur throughout the oesophagus in groups of a score or more.

Spear-like onchium very slightly sigmoid. It is probable that the pharynx extends back to oppose the row of cephalic setae. The cuticle on the anterior surface of the head, as far back as the cephalic setae or a little farther, reminds one of the covering on the head in Thoracostoma, but the thickening is less pronounced, and the cuticle here is not materially different in color or texture from that elsewhere on the body. Where the cuticle reaches its maximum thickness, near the lips, it is three to four times as thick as elsewhere on the body. From this point backward to near the base of the head, it gradually grows thinner. The oesophagus continues to have the same diameter until after it passes through the nerve-ring; then it begins to congeal, so that finally it is two-thirds as wide as the base of the neck. The intestine, set off by a deep constriction, becomes at once about two-thirds as wide as the body. Its cross-section would present four to six cells packed with minute granular matter. The onchium extends back as far as the corresponding portion of the body. The onchium is about half as wide as the body, and is located on the ventral side just in front of the cardia; its pyriform ampulla is one-fifth as wide as the corresponding portion of the neck. The lateral fields appear to be about one-third as wide as the body, and contain numerous, rather small, scattered nuclei. The nerve-surroundings of the oesophagus are very close. Tail of the male onchium in the anterior four-fifths; then cylindrical for a short distance to the almost imperceptibly swollen terminus. The cuticle glands are apparently located opposite to and a little behind the anus, and present the peculiarity that one of them, the one on the ventral side, has a separate duct leading to the separate smaller ampulla in the slightly enlarged spinosept, while the other two have their ducts parallel and close together and appear to join in a single, much larger ampulla opposite the smaller one. From these ampullae, minute ducts lead backward to the pore of the spinosept, which presents a minute, conoid depression on the terminus. Supplementary organ tubular, of about the same diameter as the spicula, extending first inward, then directly forward. It is about one-third as long as the corresponding body-diameter. Its outlet is opposite the middle of the spicula. There appear to be some obscure papillae on the tail, evidenced by almost imperceptible ventral elevations. Mention may be made of one of these near the beginning of the middle third, and another near the beginning of the posterior third. Spicula slender, uniform, acute, one and one-half times as long as the tail, and five to six times as long as the anal body-diameter. Their proximal ends are ciliated by expansion. They are accompanied, in both front and behind, at their distal extremities, by accessory pieces two-thirds as long as the anal body-diameter. The ejaculatory duct is one-fourth as wide as the body, and extends forward to near the middle of the body, where it joins the testes.

Habitat: Shoal in Kingston Harbor, Jamaica, in about one foot of water. This genus bears a very considerable resemblance to Digitonchus. Fig. 108, p. 328.

109. Isonemella acuta n. sp. Body-wall thick and muscular; in the middle of the single specimen seen it takes up about three-fifths of the radius. There are a few extraordinarily minute setae to be seen on the tail; otherwise than these, and those shown in the illustration, no others are known. There appear to be three lips, but they are so small and so thoroughly camouflaged that it is very difficult to decide on their structure, and it is possible that there is no division of the margin of the mouth into lips. The mouth opening is nearly as wide as the frontal end of the head. Between the thin lips there is a very short vestibule, whose limits are marked by the presence of an internal refractive structure on the inner wall of the pharynx very near the margin of the lips. It is impossible to say from the observations so far made whether this refractive marking is a circular affair or whether it is discontinuous, and represents special thickenings on the inner surface of the three components of the lip-region. The result of this thickening is a sudden, but very slight narrowing of the vestibule. The very short vestibule, therefore, begins nearly as wide as the front of the head, widens out posteriorly and then soon suddenly narrows to the beginning of the pharynx proper. At its base this latter taper to join the lumen of the oesophagus. At first sight it appears that, with the exception of the above-mentioned, excessively minute, cuticularized processes at the base of the vestibule, the pharynx does not present any feature suggestive of a particular armature, but there is a minute, forward-pointing ventral (?) onchium of small size. The walls of the pharynx, though distinctly outlined by the refractive nature of the cuticle, are very thin throughout. The lip-region stands more strongly than any of the succeeding portions of the head, or of the anterior part of the neck. All that portion of the lip-region in front of the middle of the pharynx takes part in this staining, and the posterior contour of the stained portion extends outward and backward from the front part of the pharynx. Behind this stained portion, indicated in the illustration, there are two elongated "cavities," beginning opposite the middle of the pharynx and ending a little behind the eye-spots, one dorsal and one ventral, and the outer contour of the head opposite these "cavities" is very slightly elevated, in the single specimen so far examined. When viewed in profile these "cavities" have a size and contour...
somewhat similar to that of the pharynx. The amphids, difficult to observe, have a somewhat elongated, inward, refractive extension, as shown in the illustration. Eye-spots colorless or slightly yellow. There are rather incompletely silvery collections of golden brown pigment granules in the anterior portion of the oesophagus. This latter continues with much the same diameter for some distance, but gradually enlarges. After it passes through the nerve-ring it is two-fifths as wide as the corresponding portion of the neck, and it finally becomes three-fifths as wide as the base of the neck. Its radial musculature is very strongly marked in the posterior half, reminding one to some extent of the oesophagus in Bolbella. The nerve cells both before and behind the nerve-ring are an unusually prominent feature. A little more than half way from the head to the nerve-ring the foremost of these cells occur as two lateral epiplial or granular cells half as wide as long, and having a length one-third as great as the corresponding width of the neck. Almost on a level with these is a ventral cell, and immediately behind them are other lateral cells of somewhat smaller size, and thence onward the neck is packed with cells of the same character, gradually becoming globular and continue behind the nerve-ring and cease about half way between the nerve-ring and the cardia. There is a collection of similar cells in front of and behind the anus. The cardia is conoid-conoid and about one-third as wide as the corresponding portion of the body. The intestine becomes at once about two- to three-fifths as wide as the body. The cuticle is almost continuous, though the posterior lip is very slightly raised. The refractive, narrow rectum is about one and one-half times as long as the anal body-diameter. The tail begins to taper from a little in front of the anus, and tapera at much the same rate behind the anus, in such a fashion that at its middle the diameter is about one-third as great as at its base; thence onward, it tapers but little and ends in a terminus about one-fourth as wide as its base. Caudal glands appear to be located in the base of the tail. The rectal cell is located just behind the base of the neck. The lateral fields appear to be about one-half as wide as the body, and are characterized by a succession of groups of cells, which are larger than usually seen in these regions. These groups contain dozens of nuclei packed rather closely together. At first, the oesophagus has a diametre fully two-thirds as great as that of the corresponding portion of the neck, and it retains this diameter until after it passes through the nerve-ring; about half way between the nerve-ring and the cardia, it begins to expand, and continues to do so very gradually, so that finally it is about three-fifths as wide as the base of the neck. The anterior cells of the intestine are more transparent and otherwise different in appearance from those which succeed, and it is infrequently happens that they present a strong resemblance to the oesophagus, so that the real position of the cardia constrictor is likely to be mistaken. The intestine is at first about two-thirds as wide as the body. It soon, however, becomes three-fourths to four-fifths as wide as the body, and is composed of rather massive cells, so that the lumen is narrow. Its cross-section probably presents about six cells. These contain numerous granules, rather uniform in size and so arranged as to give rise to an indistinct tessellation. From the inconspicuous anus, the rectum, which has about the same length as the anal body-diameter, extends inward and forward. The lateral fields are one-third as wide as the body. Rectum unknown; it is possible that the rectal cell is unknown and located near the cardia constrictor. The tail of the female is supposed to be like that of the male described below, but there is
uncertainty on this point, as all the female specimens so far examined have lacked the posterior portion of the tail—the portion present has the same form as the corresponding portion of the tail of the male. From the inconsiderable vulva, the vagina leads inward and probably slightly forward. The eggs are about three to four times as long as the body and about one-fourth as wide as long. The tail of the male is confined in the anterior four-fifths, in such a way that at the beginning of the second fourth, its diameter is about one-third as great as at the anus; hence, forward, it tapers much more rapidly, and in the posterior half hardly tapers at all, the diameter for a considerable distance in front of the terminus being no greater than that of the thickness of the body-wall. There is present behind the anus a collection of cells which bear some resemblance to caudal glands, but whether they really are caudal glands and empty through a siphonet at the terminus remains uncertain. The seventeen equidistant supplementary organs are rounded, low, oval papillae separated by distances about equal to their own diameters, and occupy a distance from two to three times as great as the corresponding body-diameter. These organs appear to be innervated, but they at times closely resemble mere transverse corrugations of the cuticle. Behind the anus, at least when the tail is incurved, there are folds in the cuticle that present a very similar appearance to those just described as supplementary organs, occurring in front of the anus; these are confined to the wide and muscular portion of the tail, and do not extend, as a rule, as far backward as the corresponding appearance in front of the anus extend forward. Spicula somewhat longer than the anal body-diameter, more strongly arnute toward their proximal extremities than near the anus. They extend about two-thirds the distance across the body and then curve around toward the body-axis. There is present from the proximal ends toward the anus nearly straight refractive elements that may possibly indicate that the spicula are much wider in the middle than at either extremity. The spicula are accompanied by accessory pieces which extend inward from the anus pretty nearly at right angles and end near the body-axis. The ejaculatory duct is two-fifths as wide as the body. Posterior testes much the smaller.

Habitat: Bath Tub Springs, Jamaica, near Salt River. These are salt springs having about body temperature. Fig. 111.

112. Croconema cinctum. sp. — 333. — Cuticle thick, transparent, yellow, composed of about 500 annules imparting to the contour of the body throughout a distinctly creased appearance, and bearing numerous short, stiff, slightly curved bristles, having a length somewhat greater than its own thickness. The cuticle of the head seems to consist of a single layer of hemispherical helmet-like pieces. In all, there must be at least six irregular longitudinal rows of setae on the "helmet," but it seems impossible to pick out any single circle of these setae that particularly merit the term cephal setae. The spreading setae on the neck curve backward. Both here and toward the tail end, these setae are shorter than near the middle of the body where they are tapering, acute, nearly twice as long as the cuticle is thick and have a base one-fourth as wide as the distance between two successive annules of the cuticle. When the mouth is closed, the tips of the lips are bunched at the middle of the front of the head. There appear to be about twelve of these tips. The pharynx is about one-eighth as wide as the base of the head and is fairly well filled by the apices of the teeth. Two of these onchia (?) have been distinctly seen, a dorsal one which extends to the base of the lips and has a subacute, conical, refractive apex, and whose base is about one-eighth as wide as the corresponding diameter of the head, and a larger submedian one with a conical, refractive apex, and having a base somewhat wider than that of the dorsal one. This latter has a length somewhat greater than the width of the amphids, and its base lies near the center of the head and rather behind the middle of the pharyngeal bulb. The pharynx is strongly cutiniized, and manifestly extends backward through the greater part of the region surrounded by the "helmet," The rather obscure changes from pharynx to oesophagus takes place suddenly along two loci which extend obliquely outward and forward from the juncture of the oesophagus. The oesophagus retains the same diameter until after it passes through the nerve-ring; soon after that it begins to enlarge gradually in diameter, so that finally it is three-fourths as wide as the base of the neck. The intestine is at first very narrow, about one-fifth as wide as the body, and for a short distance has a different structure from the portion that follows. Possibly this first part should be considered a cardi. In this cardine portion, there are no cells containing granules. Immediately behind the "cardine," portion of the intestine is half as wide as the body and would present eight to ten cells in cross-section. The cells contain brownish granules of uniform size, so arranged as to give rise to a distinct tessellation. The intestine is moderately thick-walled. From the raised anus, the strongly cutinized rectum, which is somewhat longer than the anal body-diameter, extends inward and then almost directly forward, so that it joins the intestine considerably ventral to the body-axis. The tail is arcuate-convoluted, and presents the peculiarity that the anus of the cuticle ceases in front of the middle; thence outward, the cuticle is considerably thicker and is traversed by radial markings, which pass outward and a little backward and give to the surface of this portion of the tail a distinctly punctate appearance, which, however, is less marked than the similar appearance on the head. The caudal glands are arranged tundem immediately in front of the anus, extending from the end of the intestine proper to a little behind the anus. There is apparently a small renecete cell immediately behind the oesophagus. The nerve-ring surrounds the oesophagus obliquely. From the slightly elevated, rather inconspicuous vulva the vagina extends nearly half way across the body. The ovaries reach more than half way back to the valves, and contain a dozen to twenty developing ova, arranged irregularly.

Habitat: Sand and marine algae, in surf, shore of small island off Port Royal, Jamaica. Fig. 112.
ORDER ANAXONCHA

113. Nudora lineata n. sp. Cuticle two to three times as thick at the head end as elsewhere; more or less like that of Desmodora, but with longitudinal striæ somewhat like those of Monoposthia. The annules increase in width, and are more accentuated, toward the head. Each of the ten longitudinal rings appears to comprise a series of "Q X-like markings on the anterior portion of the body, which are reversed on the posterior. Following the seriate contour of the head it is discovered that this reversal takes place not far behind the neck. There seem to be twelve, subdistict, more or less conoid, minute, blunt labial elements. The labial papillæ are more or less setose, one seta between each pair of labial elements. Limits of the pharynx rendered very definite on account of the elongated pharyngeal swelling. Anterior part of the pharynx cyathiform, posterior triquetrous-tubular. Posterior part of the neck cylindroid, anterior conoid, anterior convex-conoid, the amphids appear about as deep as the cuticle is thick. In front of the wide annule bearing the amphids, there is another about as wide as those on the neck, which, however, does not thin out on its anterior edge, as do the regular annules. Following this annule comes the lip-region, which in contra-distinction takes a carmine stain. The elongated, pharyngeal bulb, one-half as wide as the neck, is set off from the remainder of the oesophageus by a constriction. The oesophageus is at first one-third, near the nerve-ring one-third, preceding the cardiae bulb one-third, and finally five-sixths, as wide as the corresponding portion of the neck. The cardiae bulb is cylindroid and makes up one-third of the oesophageus. Its musculature is coarse and colorless. The oesophageus tube expands suddenly to form the cardiae bulb, which is divided into two main parts by a break in its musculature. There are smaller breaks, also, near each end. The lining of the oesophageus appears to occupy one-sixth of its width. The rather thin-walled, narrow intestine becomes twice one-fifth as wide as the body. At the cardiae constriction the intestine joins the center of the posterior surface of the oesophageus bulb. Minute granules are scattered in the intestinal cells. The conoid tail, on which there are obscure longitudinal striæ, tapers from the anus to the non- striated, simple, symmetrical spinneret. The broadly sacculated caudal glands form a close tandem in the anterior half of the tail. Sclerous caudal setae occur on the tail end, both preanal and postanal, three to four ventrally submedian, and three to five dorsally submedian, just in front of as well as behind the anus, about one and one-half body-widths apart, and shorter on the male than on the female. The rather broad ovary setae near its blind end. The flattish ova are arranged for the most part single file. The spicula are frail, very slender, mostly uniform, but finally tapering and acute. Their proximal ends appear to lie opposite the body-axis. The yellow accessory pieces are somewhat longer than the spicula. They are arcuate and stoutish, and their proximal ends appear to lie somewhat dorsal from the body-axis. There are two obscure supplementary organs, the anterior of which is located at a distance in front of the anus equal to one and one-half body-diameters, the posterior being opposite the middle of the spicula. These consist of slight elevations further accentuated by small alterations in about three consecutive annules.

Habits: Sand, below low tide mark, Hull, Massachusetts, U. S. A. Fig. 112.

114. Rhinema retrorsumn. sp. Cuticle thick, interrupted at twelve places so as to form exceedingly distinct longitudinal wings, which when brought into focus give a somewhat "feather"-like effect. The annules and their modifications give a reverse appearance to the entire cuticle, but in reality the striæ are retrorsum in the posterior part of the body, and the reverse in the anterior part. Some of the cuticular markings cease in front of the anus on the male and are not continued on the tail, so that the tail has a somewhat unusual appearance. There are submedian longitudinal striæ extending to the middle of the tail. Neck for the most part cylindroid. Opposite the dorsal tooth there is a distinct junction with the cuticle of the lip-region indicated by an almost imperceptible constriction encircling the head. In front of this constriction there are two others, close together, connected with the lip-region. Lips with outward-curved aps, surrounded by two "Q X-like deformities, a character that might speak it as a bulb. There is no very distinct cardia. Renette unknown. Younga, about three-fifths as great as that of the front of the head, and a depth not more than half that amount. Into the midst of this shallow cavity the doral onchium projects. Sometimes, however, this cavity is deeper, namely, when the dorsal tooth is withdrawn to a greater extent. Then the cavity is about half as wide as the head, and about as deep as wide, and the lip-region is manifestly more closed. Onchium faintly spire-like. Muscles of the pharynx of an entirely different character from those of the oesophageus, which begins as a tube about half as wide as the corresponding portion of the neck, and continues to have this diameter until after it passes through the nerve-ring, thereafter expanding gradually, but finally somewhat faster, so that at the end it becomes two-thirds as wide as the base of the neck. The posterior swelling is of such a character that one might speak it as a bulb. There is no very distinct cardia. Renette unknown. Younga. Slightly across and obliquely half way across the body. Mature ova at the front, ready to enter the uterus. Ova one and one-half times as long as the body is wide and about half as long, with nuclei one-third as broad as themselves. The row cavities are more or less cylindroid and contain comparatively few ova, apparently arranged more or less single file. Anus of the male distinctly raised. Tail arcuate and conoid to the naked terminus, which has a length about equal to that of five of the preceding annules. Position of the cardiae plucks doubtful, but it is quite possible that they are located in the base of the tail. There are a few inconsiderable hairs on the smooth terminus that are not shown in the illustration, of which two have been seen in the ventrally submedian position, having a length about two-thirds as great as the corresponding diameter of the terminus. No supplements or special papillæ or setæ have been seen, though it is possible that very small setæ may have escaped observation. The slender, slightly arcuate, rather uniform spicula have their proximal ends almost completely cephalized by expansion. The uniform proximal three-fourths of the spicula, when viewed in profile appear to have approximately the width of one of the adjacent annules. In the distal fourths the spicula taper to an acute point. There is a single, nearly straight but slightly "S"-shaped accessory piece, two-thirds as long as the spicula, which is acute at its distal extremity and capable of protrusion to a certain extent. It is fully as wide as the spicula.
ORDER ANAXONCHIA

Its proximal half curves away from the spicula and then returns, and is connected with the ventral part of the body-wall a short distance behind the anus by means of oblique muscles.

Habitat: Coral sand, New Hebrides. This genus differs from Chromadora, Spilophora, and Euchromadora, in the possession of distinct circular ampullae, and also in the possessizion of twelve longitudinal cuticular costae. In this latter respect it resembles Monoposthia, but here the spicula are double, and there are no supplementary organs or swellings. The lip-region and pharynx also present contrasts with any of the above genera. The striking differences are: (1) The continuation of the pharynx in its narrow part as a definite well-lined posterior chamber, ending definitely opposite the point where the pharyngeal bulb is separated from the oesophagus by a distinct constriction. (2) By the form of the lips, instead of being soft and internally folded as to give rise to about twelve refractive ribs, or folds, are more strongly built, cutinized, and outwardly recurved, and are only six in number. (3) -M-Fig. 114, p. 335.

115. Isodonurus punctulatus n. sp. Cuticle rather thin, and naked, resolvable near the anterior extremity into elements which are interrupted on the lateral fields. These wings begin near the head and end behind the middle of the tail. The wing-region is a space about equal to the width of one of the annules.

Habitat: Punta Arenas, Pacific coast of Costa Rica. Marine. Fig. II.5.

PTTCHOLAIMULUS

Habitat: Coral sand, New Hebrides. This genus differs from Chromadora, Spilophora and Euchromadora, in the possession of distinct circular ampullae, and also in the possession of twelve longitudinal cuticular costae. In this latter respect it resembles Monoposthia, but here the spicula are double, and there are no supplementary organs or swellings. The lip-region and pharynx also present contrasts with any of the above genera. The striking differences are: (1) The continuation of the pharynx in its narrow part as a definite well-lined posterior chamber, ending definitely opposite the point where the pharyngeal bulb is separated from the oesophagus by a distinct constriction. (2) By the form of the lips, instead of being soft and internally folded as to give rise to about twelve refractive ribs, or folds, are more strongly built, cutinized, and outwardly recurved, and are only six in number. (3) -M-Fig. 114, p. 335.

116. Ptycholaimellus carinatus n. sp. Cuticle rather thin and naked, resolvable near the anterior extremity into elements which are interrupted on the lateral fields. These wings begin near the head and end behind the middle of the tail. The wing-region is a space about equal to the width of one of the annules.

Habitat: Punta Arenas, Pacific coast of Costa Rica. Marine. Fig. II.5.
as wide as the body. It contains a single nucleus, which is swung centrally in the protoplasmic network. The remete cell has two spherical elliptical companion cells in the rear. The excretory pore lies at the base of the lips, and is connected with the elongated, fusiform ampulla by means of a duct which extends from the base of the lips to nearly opposite the base of the pharynx. Sometimes the ampulla is much elongated, and one-fourth as wide as the corresponding portion of the neck, reaching nearly to the nerve-ring. The tail begins to taper from far in front of the anus, and tapers at about the same rate for some little distance behind the anus, then tapers more rapidly for a short distance, and then finally tapers gradually to the terminus. The caudal glands are located in the base of the tail. The vulva is massive and yet does not project much beyond the main ventral contour. It is prominent on account of a depression which surrounds it. From the vulva the large vagina leads inward half way across the body. The tapering, reflexed ovary reaches half way back to the vulva and contains upwards of ten oval arranged single file. The prostate eggs are nearly as long as the body is wide and have been seen in the uterus one at a time. The distance between the wings on the cuticle, near the anus of the male, is about equal to the width of two of the annules. The tapering, yellowish spicula are more strongly articulate in their proximal halves than elsewhere. At their widest part they are about one-sixth as wide as the corresponding portion of the body. Their proximal ends, when viewed laterally, appear to lie opposite the body-axis. An indistinct refractive line passes from the proximal ends of the spicula to the distal ends, indicating that the spicula may be wider than would be judged by a consideration of only the main portion of their framework. The accessory pieces are one-half as long as the spicula and in the main parallel to them and are arranged in comparatively close contact. Near the anus, however, the framework of the accessory pieces bends away from the spicula. Each accessory piece ends in an acute protrusion, which is rather suddenly and rather markedly bent forward. The spicula present the same arculate appearance at their tips as do the accessory pieces. Both the exhalant and duct and vesicules are about one-third as wide as the corresponding portion of the body.

Habitat: Larit, East Indies. Marine; apparently very common. Sublime to balsam. Fig 116, p. 337. An examination of the head gave equally satisfactory evidence of the existence of joints in the setae.

117. Actinonema pachydermatum n. sp. Cuticle naked, very thick, occupying one-half the radius as measured at the base of the neck. Anules alike except that they grow narrower toward the extremities, especially the head end; resolvable with difficulty into rod-like markings, with less difficulty on the anterior half of the body. The prominent wings, beginning on the head, end near the middle of the tail. As there are deep, narrow grooves between the annules, the contour of the body is irregularly crenate. Head set off by constriction and a deep constriction, truncate; mouth more or less depressed. The lip-region is one-half as high as wide, and appears to be composed of three fairly well developed, rounded, sub-different, which are set off by constriction. On the lips there is no obvious sign of a ciliate. The pharynx is very small and inconspicuous, or even absent apparently. There seems to exist, however, a minute, more or less areneate dorsal oesophagus, to be seen in balsam specimens only when dissected. The neck is conoid, the head convex-conoid. Amphids nearly straight transverse slits, four-fifths as long as the corresponding diameter of the head, and apparently eight times as long as wide. One of the foremost annules appears to be more or less discolored—that is so to say, the regular succession of the foremost annules is somewhat disturbed by one-third as wide as the corresponding portion of the neck. There is no distinct cardia. The rather thin-walled intestine, which becomes at once two-fifths as wide as the body, has a distinct lumen. Its cross-section presents four to six cells. Cardiacum one-fifth as wide as the body. The depressed anus the prominent cutinized rectum is one and one-fourth times as long as the anal body-diameter. The cells of the intestine contain numerous, very fine, colorless granules. The conoid, subareate tail tapers from in front of the anus to the simple, unarmed, conoid-conoid, rather blunt splanchnet. The elliptoidal caudal glands are small and inconspicuous, more or less asymmetrical, and apparently lie in a loose cluster opposite the anus. The elongated fusiform granular remete cell lies behind the neck a distance equal to one and one-half body-diameters; it is as long as the body is wide and one-fifth as wide as long. The intumescent ends appear to lie more or less opposite the body-axis. The simple, rather frail, slender accessory piece is about two-thirds as long as the spicula. There are no supplements or special papillae. Habitat: "Seagrass," about two miles off Key West, Florida, U.S.A. Fig. 117.

118. Rhips ornata n. sp. Fig. 118, p. 337. Cuticle thick, cutinized. Rod-like markings, more or less changeable; sunken visible into rod-like markings, changing so as to produce a basket-like effect on the neck. On the posterior half of the body on each lateral field each annule presents two forward-pointing, "V"-shaped marks of unequal size, the ventral being the larger; these are inconspicuous, but are less so posteriorly. These markings occur also on the anterior half of the body, but are there reversed. On a pair with the cephalic setae, and just in front of the ends of the amphids, there are four sublateral, special scales, or short, more or less conical horns, about half as long as the setae. The oesophagus is conoid, though there is a more or less pronounced elevat ed cardia swelling. At the nerve-ring the oesophagus is one-half, and finally three-fourths,
as wide as the corresponding portion of the neck. The rather prominent lining of the oesophagus finds expression in about three parallel retractive lines, occupying a space equal to two-fifths its width. The fine musculature is more or less pigmented. There is a decided thickening of the lining in the cardiac swelling. There is no cardia. The thin-walled intestine presents a faint lumen, and becomes at once three-fifths as wide as the body. Cardiac column one-fourth as wide as the neck. From the more or less continuous anus, the incompurcuous rectum leads inward a distance one and one-fourth as great as the anal body-diameter. The postanal region has the appearance of lacking one of the regular stipes. Colorless granules of variable size are scattered in the intestinal cells. The largest of them are about half as wide as one of the annules. The conoid, subcontrales tails from in front of the anus to the convex-conoid spineret. Apparently, the caudal glands lie in the anterior third of the tail. Though the remete has not been clearly seen, it appears to lie two body-widths behind the neck, to be elongated and twice as long as the body is wide. The large, elevated, conspicuous vulva, occupying twenty-five to thirty annules of the cuticle, leads to a medium-sized vagina. The female sexual organs are double and symmetrically reflexed. The eggs are probably rather large, since an ovum which has not yet entered the uterus, but appears to be mature, is three times as long as the body is wide. Spherical, granular spermatozoa, one-half as wide as the body, were seen in the uterus. Spicula two-jointed, as shown in the illustration. A mature specimen in which the spicula were lacking, suggesting that possibly they are lost at the time of copulation. See adjacent illustration. Accessory pieces, two in front of the spicula and two behind, with an additional median one, behind that is to say, five in all. The ventral, longitudinal optical section, about twenty-five annules in front of the anus, is such that the subcuticle appears more or less as if rectrassely serrate. This alteration in the annules is co-extensive with the oblique copulatory muscules, so that no doubt these structures must be regarded as indicating the presence of supplementary organs.

Habitat: Marine mud, Ocean Beach, Florida. U. S. A. Figs. 118 a and e.
Bolbinium... 240 exile

INDEX